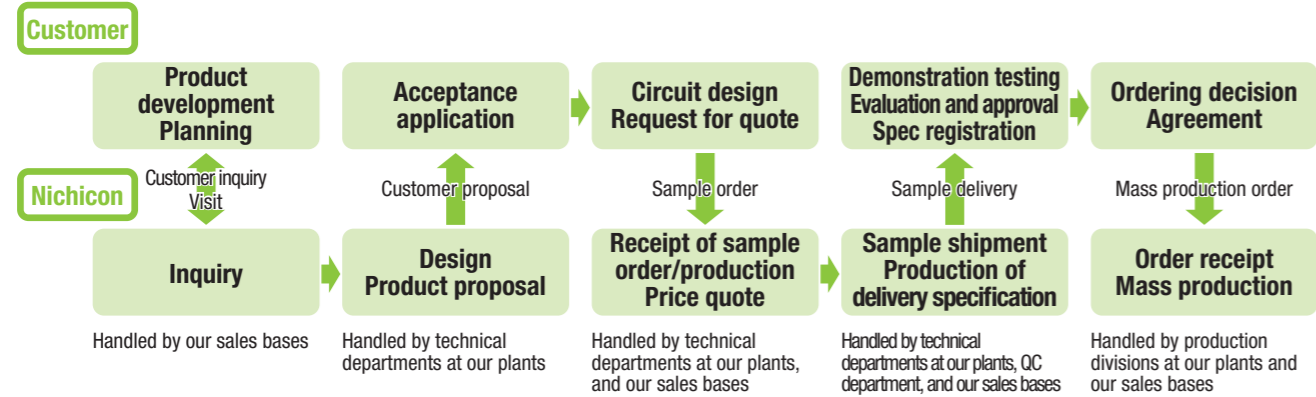


	Snap-in terminal type aluminum electrolytic capacitors	Screw terminal type aluminum electrolytic capacitors	Miniature aluminum electrolytic capacitors	Chip-type aluminum electrolytic capacitors	Electrical double layer capacitors	Conductive polymer aluminum solid electrolytic capacitors	Film capacitors
Japan	●	●	●	●	●	●	●
China	●	●	●	●	●	●	●
Malaysia	●	●	●	●	●	●	●

Note: Please confirm when ordering because some series, sizes and specs are not being produced.

## Standard Process for Custom Product Development

We offer products optimized to meet our customers' application, size and other design needs.



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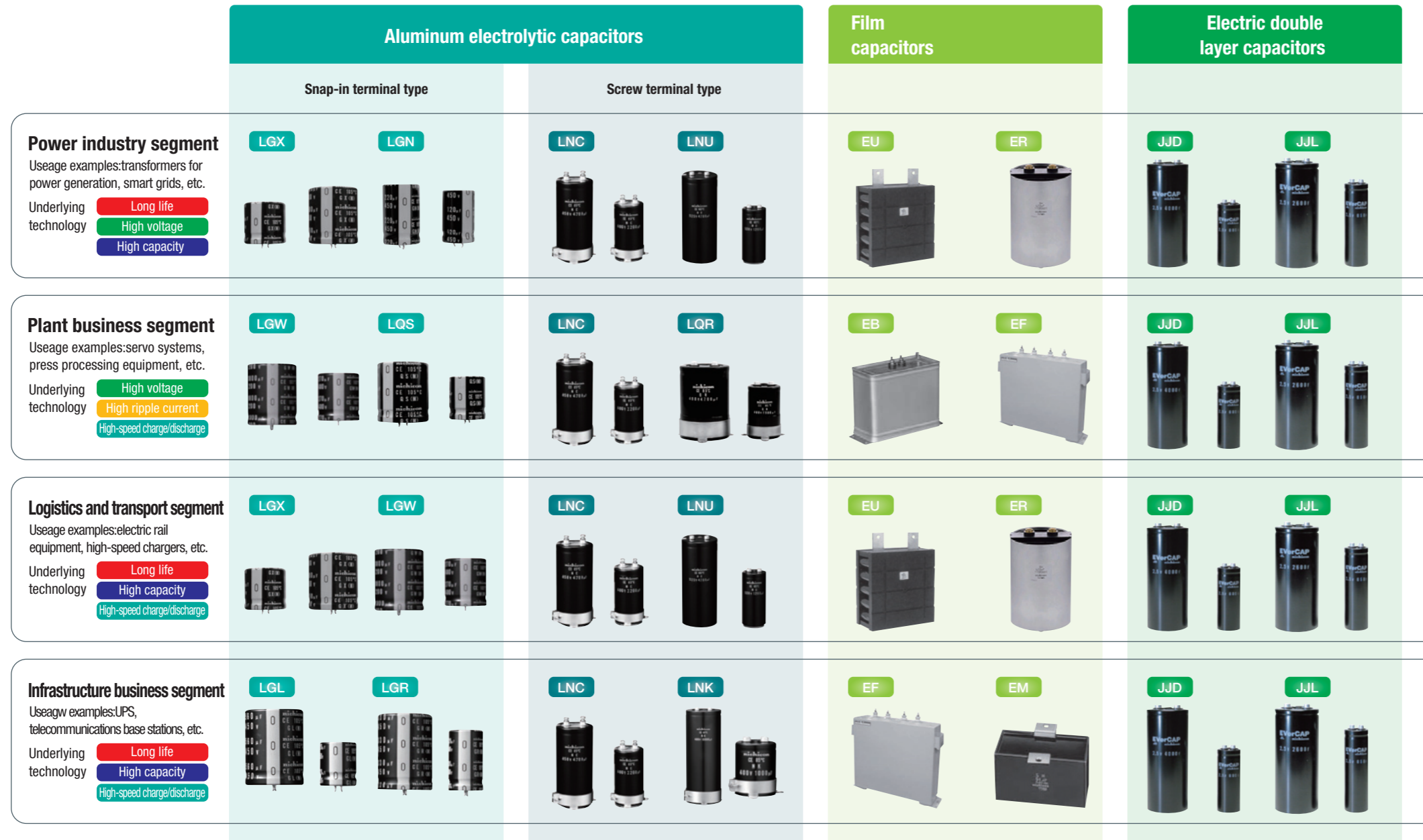
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# Power Electronics Application

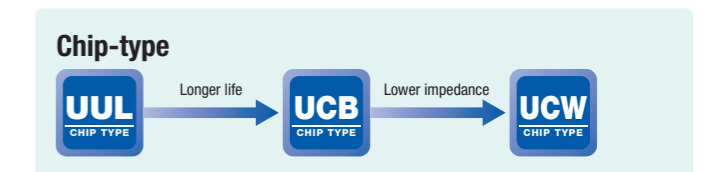
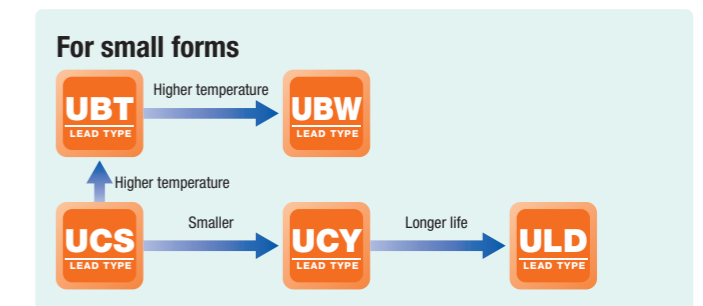
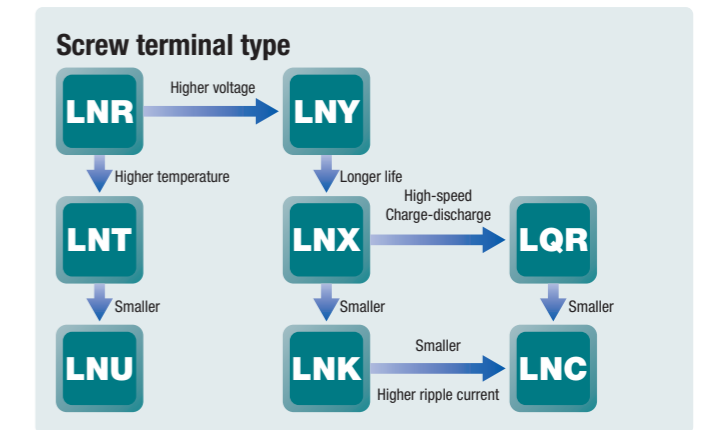
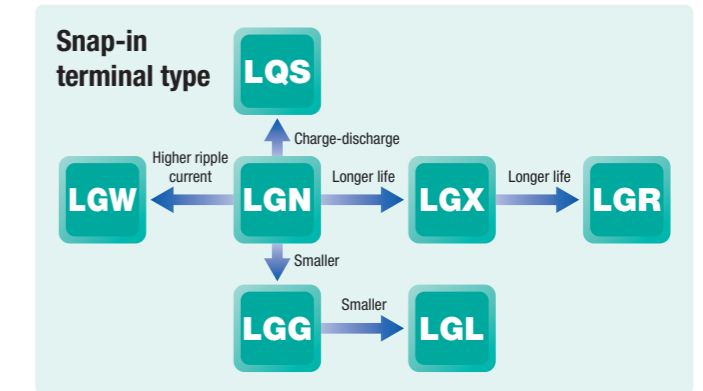


# Series Recommended for Use with Power Electronics

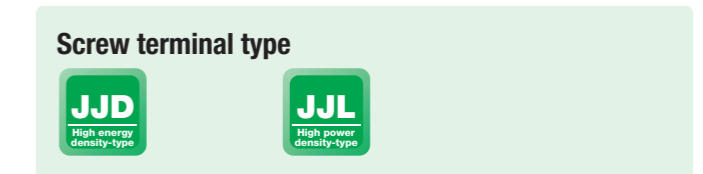


# Power electronics-use capacitor series system diagram

## Aluminum electrolytic capacitors



## Electric double layer capacitors



## We supply optimal capacitors.

Product varieties	Dry film capacitors	Comparison	Aluminum electrolytic capacitors
<b>Performance categories</b>			
High voltage	High (Response corresponding to use)	>	- 630V (NX Series)
Maximum allowable working temperature	105°C	—	105°C
Capacitance range	to low capacity	<	to high capacity
Capacity unit price	High	<	Inexpensive
Capacity tolerance	±3% to ±10%	>	±10% to ±20%
Loss temperature/frequency response characteristics	Low rate of variability	>	High rate of variability
Ripple current durability	Large	>	Small
Electrolytic fluid	Unused	—	Use
Shape	High degree of flexibility	—	Basic shape is circular
Polarity	None	—	Available

## Film capacitors

### Resin-molded case



### Circular aluminum case



### Rectangular metal case



# Special characteristics of Nichicon capacitors supporting the power electronics industry

## Aluminum electrolytic capacitors

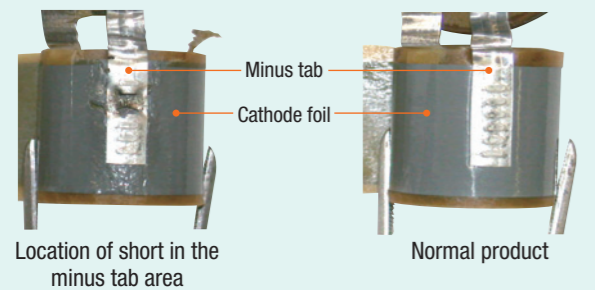
### Supporting charging and discharging

We offer highly safe products constructed with cathode foil covering the tab (Nichicon patented technologies).

#### Problems caused by the addition of high-speed charging and discharging

Voltage fluctuation ( $\Delta V$ ) is great in equipment such as servo amplifiers, and the addition of a short-cycle (high-speed) charging and discharging load can lead to shorting in a short period of time.

#### Example of failure mode when there is a charging and discharging load



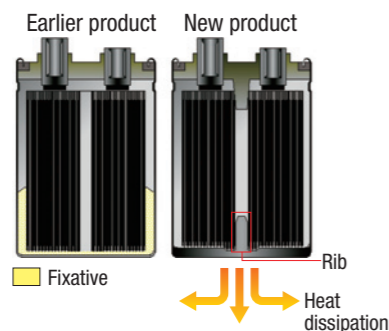
#### Measures for high-speed charging and discharging

Development of "protective foil construction" by which the tab is covered with cathode foil and a piece of foil of the same type.

This technology is currently established to support high-speed charging and discharging, and is used in the QS Series snap-in terminal type and QR Series screw terminal type capacitors.

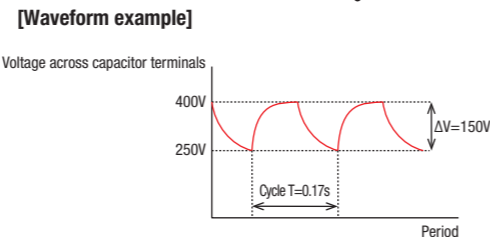
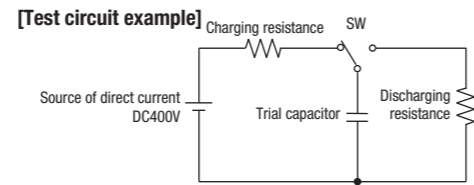
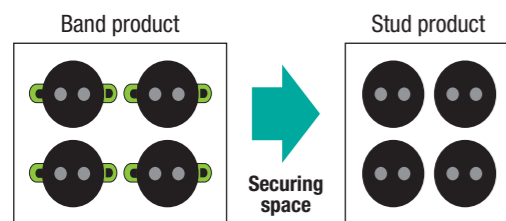
#### Heat dissipating structure – compoundless structure

A fixed rib structure is used in place of resin for element fixing, improving the capacitor's ability to dissipate ripple current load heat.



#### Saving space

Space for product placement can be secured and attachment work improved by eliminating the need for an attachment band.



[Verification results]

	Countermeasure method	Charging/discharging recovery when short occurs	Location of short
①	Standard configuration product	Five million periods	Cathode tab area
②	Protective film construction	*50 million periods with no occurrence	—

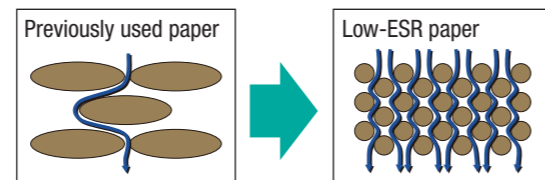
In charging/discharging tests in which  $\Delta V=150V$ , products made according "protective film construction" specifications presented no problems with their special characteristics even after 50 million periods.

#### Reduced ESR – Separator improvement

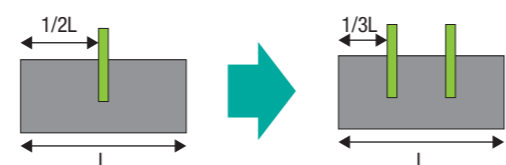
Use of reduced-ESR electrolysis paper reduces the heat generated by the capacitor. In addition, reducing thermal resistance broadly improves heat dissipation efficiency.

In the past, craft paper-type electrolysis paper, which has comparatively thick fibers, was generally used, and by using smaller-fiber reduced ESR electrolysis paper we can reduce the heat generated (temperature rise  $\Delta T$ ) by the capacitor. Also, by increasing the number of aluminum tabs we reduce metal resistance so as to reduce ESR.

[Images showing a cross section of electrolysis paper and electrolytic fluid ionogen transference]



[Reducing metal resistance by increasing the number of tabs]



## Film capacitors

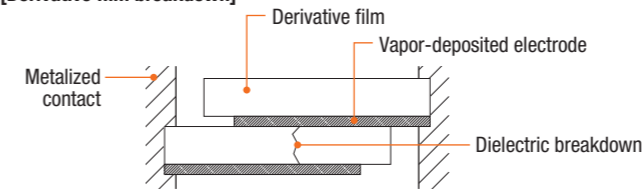
### Safety functions

We offer high-voltage, high-capacitance products with improved safety via our exclusive vapor deposition pattern.

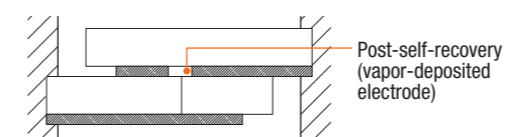
#### Self-recoverability

Because the vapor-deposited electrode in a self-healing (SH) film capacitor is a thin metal membrane, in the event of a dielectric breakdown that portion of the electrode is instantly vaporized, and capacitor function is recovered.

#### [Derivative film breakdown]



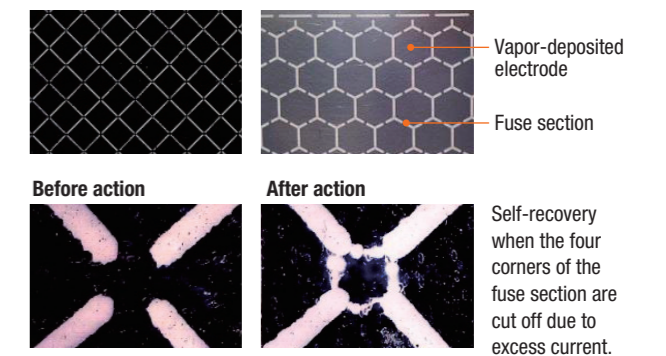
#### [Post-self-recovery SH film capacitor]



#### Safety

This capacitor is characterized by the lack of affect on the capacitor's electrical function when a dielectric breakdown occurs as a result of exceeding the self-healing (SH) film capacitor's self-recovery limit. This is because the excess current that occurs at the time of the breakdown cuts away the subsection of the capacitor that has failed.

#### [Example of protective mechanism-type]



#### Saving space

Able to support a variety of forms.

We support customization that keeps space to the customer's desired specifications.

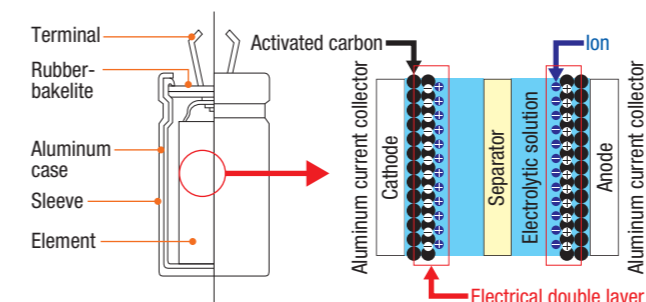


## Electric double-layer capacitors

### Long life

We offer low-deterioration products with long lifespans.

This device uses electrical double layers between a solid and liquid interface. The charge and discharge are created through physical adsorption/dispersion of ions. Consequently, there is little deterioration of the electrode or electrolytic fluid, providing much longer life than batteries that use chemical reactions.



### Variety of storage uses

Offering a variety of applications in place of existing batteries.

- 1. Standby power source**  
Enables thorough power savings and improves environmental performance when used as a power storage device for standby power for remote controls for televisions, air conditioners, and game consoles.
- 2. Backup power source**  
Offers lighter weight and longer life than existing lead batteries when used as a stable, short-term power source in a variety of applications.
- 3. Emergency-use local power supply for essential utilities**  
Unlike batteries, which must be changed in the short term, these can provide long-term maintenance-free power sources for essential utilities.
- 4. Stand-alone power source**  
When used in conjunction with small photovoltaic cells or similar they can function as a power source for street lamps, traffic signals, etc.

# Summary of Series According to Use

## Charge/discharge control circuit

**LGW** Snap-in terminal type 105°C products supporting high ripple current

- Products supporting high ripple current
- Products with rated ripple current application guaranteed for 3,000 hours

Product size	ø22×25L to ø35×50L
Endurance	3,000 hours at 105°C
Rated voltage	200 to 450V
Capacitance range	82 to 2,200µF

**LGX** Snap-in terminal type 105°C Long-life, miniature product

- 500V rating added
- Long-life products with rated ripple current application guaranteed for 5,000 hours

Product size	ø22×25L to ø35×50L
Endurance	5,000 hours at 105°C
Rated voltage	200 to 500V
Capacitance range	56 to 2,200µF

**LGR** Snap-in terminal type 105°C long-life products

- Optimal for use in power source circuitry requiring a high degree of reliability
- Products with rated ripple current application guaranteed for 10,000 hours

Product size	ø22×25L to ø35×50L
Endurance	10,000 hours at 105°C
Rated voltage	200 to 450V
Capacitance range	39 to 1,500µF

**LQS** Snap-in terminal type 105°C Product supporting high-speed charging and discharging

- Supports voltage fluctuations in regions in which the commercial power source situation is poor
- Products with rated ripple current application guaranteed for 3,000 hours

Product size	ø22×25L to ø35×50L
Endurance	3,000 hours at 105°C
Rated voltage	350 to 450V
Capacitance range	82 to 820µF

**LNC** Miniature screw terminal type 85°C supporting high ripple current

- Standard support for high-speed charging and discharging load
- Products with rated ripple current application guaranteed for 5,000 hours

Product size	ø51×55L to ø90×215L
Endurance	5,000 hours at 85°C
Rated voltage	350 to 500V
Capacitance range	1,000 to 22,000µF

**LNU** Miniature screw terminal type 105°C Miniature high-voltage product

- Standard support for high-speed charging and discharging load
- Products with rated ripple current application guaranteed for 5,000 hours

Product size	ø51×75L to ø90×235L
Endurance	5,000 hours at 105°C
Rated voltage	400 to 525V
Capacitance range	680 to 18,000µF

**EF** Self-healing type with protective mechanism attached

- Contributes to making devices smaller and rationalization
- Superior high frequency properties

Category temperature range	-25 to +60°C
Rated voltage	1,000 to 3,300VDC
Capacitance range	1,000 to 6,000µF

**EU** Self-healing type with protective mechanism attached

- Oil-less capacitor
- Maintenance-free

Category temperature range	-25 to +70°C
Rated voltage	750 to 3,300VDC
Capacitance range	150 to 3,100µF

**EM** Self-healing type with protective mechanism attached

- Maintenance-free, long-life product
- Low-impedance product supporting high ripple appropriate to high-frequency use

Category temperature range	-25 to +70°C
Rated voltage	250 to 1,200VDC (220 to 250VAC)
Capacitance range	0.5 to 50µF

**ER** Self-healing type with protective mechanism attached

- Capacitor supporting an oil-less environment
- Resin-mold type with protective mechanism attached

Category temperature range	-40 to +85°C
Rated voltage	750 to 1,500VDC
Capacitance range	180 to 700µF

## Power storage/load smoothing use

**JJD** Screw terminal high energy density-type

- High energy density-type for long-term backup applications
- Optimal for power storage

Product size	ø40×105L to ø76.2×165L
Endurance	2,000 hours at 60°C
Rated voltage	2.5V
Capacitance range	1,000 to 6,000F

**JJL** Screw terminal high power density-type

- High power density for instant energy output
- Can be used for high-speed charging/discharging

Product size	ø40×105L to ø63.5×150L
Endurance	2,000 hours at 60°C
Rated voltage	2.5V
Capacitance range	700 to 2,600F

## Control and signal circuit use

**UBT** Highly reliable product (125 °C product)

- Highly stable product for high temperatures, guaranteed at 125 °C
- For locations with harsh use conditions

Product size	ø8×11.5L to ø18×35.5L
Endurance	2,000 to 10,000 hours at 125°C (50V or less, ø8:2,000 hours, ø10 : 5,000 hours, ø12.5 or more:10,000 hours, 63 to 100V, ø8:2,000 hours, ø10:3,000 hours, ø12.5 or more:5,000 hours, 160V or more:2,000 hours)
Rated voltage	10 to 450V
Capacitance range	1 to 4,700F

**UBW** Highly reliable product (135 °C product)

- Highly stable product for high temperatures, guaranteed at 135 °C
- For locations with harsh use conditions

Product size	ø8×11.5L to ø16×31.5L
Endurance	1,000 to 3,000 hours at 135°C (ø8:1,000 hours, ø10:2,000 hours, ø12.5 or more :3,000 hours)
Rated voltage	10 to 100V
Capacitance range	1 to 4,700µF

**UCS** Miniature high ripple current long-life product

- Supports high ripple current
- Products with rated ripple current application guaranteed for 10,000 hours (Some, 8,000 hours)

Product size	ø10×16L to ø18×35.5L
Endurance	10,000 hours at 105°C (ø10×16L to ø10×20L:8,000 hours)
Rated voltage	160 to 450V
Capacitance range	6.8 to 330µF

**UCY** Miniature high ripple current long-life product

- Supports high ripple current
- Products with rated ripple current application guaranteed for 12,000 hours (Some, 10,000 hours)

Product size	ø10×16L to ø18×46L
Endurance	12,000 hours at 105°C (20L or less or rated at 500V:10,000 hours)
Rated voltage	160 to 500V
Capacitance range	6.8 to 680µF

**ULD** Miniature long-life product

- Products with rated ripple current application guaranteed for 20,000 hours (Some, 10,000, 12,000, 15,000 hours)

Product size	ø5×11L to ø18×31.5L
Endurance	20,000 hours at 105°C (ø6.3×11L, ø8×9L, ø10×9L:12,000 hours, ø8×11.5L, ø10×12.5L:15,000 hours), (10 to 100V:10,000 hours)
Rated voltage	10 to 450V
Capacitance range	1 to 330µF

**UUL** Chip-type long-life product

- Surface-mount long-life product
- Applicable to automatic mounting machine fed with carrier tape

Product size	ø4×5.8L to ø10×10L
Endurance	5,000 hours at 105°C
Rated voltage	6.3 to 50V
Capacitance range	0.1 to 1,000µF

**UCB** Chip-type long-life product

- Surface-mount long-life product
- Applicable to automatic mounting machine fed with carrier tape

Product size	ø4×7L to ø10×10L
Endurance	7,000 hours at 105°C
Rated voltage	6.3 to 50V
Capacitance range	0.1 to 1,000µF

**UCW** Chip-type long-life low impedance product

- Surface-mount chip-type long-life low impedance product
- Applicable to automatic mounting machine fed with carrier tape

Product size	ø5×7L to ø10×10L
Endurance	7,000 hours at 105°C
Rated voltage	6.3 to 50V
Capacitance range	10 to 470µF

**UCD** Chip-type low impedance product

- Surface-mount low impedance product
- Applicable to automatic mounting machine fed with carrier tape

Product size	ø4×5.8L to ø18×16.5L
Endurance	5,000 hours at 105°C (50V or less, less than 10L:2,000 hours, 63V or more, 10L or less:2,000 hours)
Rated voltage	6.3 to 100V
Capacitance range	1 to 3,300µF

**UUB** Chip-type 125 °C highly reliable product

- Surface-mount chip product rated to 125 °C
- Applicable to automatic mounting machine fed with carrier tape

Product size	ø8×6.2L to ø10×10L
Endurance	2,000 hours at 125°C (ø8×6.2L:1,000 hours)
Rated voltage	10 to 400V
Capacitance range	1 to 330µF

**PCV** Conductive polymer aluminum solid electrolytic capacitors

- Highly-voltage (to 125 °C)/Low ESR/High permissible ripple current product
- Surface-mount type: 260 °C peak
- Supports lead-free soldering reflow conditions

Product size	ø6.3×6L to ø10×12.7L
Endurance	3,000 hours at 105°C
Rated voltage	16 to 125V
Capacitance range	5.6 to 680µF

**PCX** Chip-type long-life low-impedance product

- Highly reliable/Low ESR/High permissible ripple current product
- Surface-mount type: 260 °C peak
- Supports lead-free soldering reflow conditions

Product size	ø6.3×6L to ø10×12.7L
Endurance	3,000 hours (ø6.3:1,500 hours) at 125°C
Rated voltage	16 to 50V
Capacitance range	5.6 to 390µF