### Production By Country

<table>
<thead>
<tr>
<th>Country</th>
<th>Snap-in terminal type</th>
<th>Screw terminal type</th>
<th>Chip-type aluminum electrolytic capacitors</th>
<th>Conductive polymer aluminum solid electrolytic capacitors</th>
<th>Film capacitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>✰✰✰✰✰</td>
<td>✰✰✰✰✰</td>
<td>✰✰✰✰✰</td>
<td>✰✰✰✰✰</td>
<td>✰✰✰✰✰</td>
</tr>
<tr>
<td>China</td>
<td>✰✰✰✰✰</td>
<td>✰✰✰✰✰</td>
<td>✰✰✰✰✰</td>
<td>✰✰✰✰✰</td>
<td>✰✰✰✰✰</td>
</tr>
<tr>
<td>Malaysia</td>
<td>✰✰✰✰✰</td>
<td>✰✰✰✰✰</td>
<td>✰✰✰✰✰</td>
<td>✰✰✰✰✰</td>
<td>✰✰✰✰✰</td>
</tr>
</tbody>
</table>

### Standard Process for Custom Product Development

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

**Customer**

1. **Product development planning**
2. **Design product proposal**
3. **Customer inquiry**
4. **Visit**
5. **Customer proposal**
6. **Sample order**
7. **Sample delivery**
8. **Mass production order**

**Nichicon**

1. **Product development planning**
2. **Acceptance application**
3. **Circuit design**
4. **Request for quote**
5. **Specification and dimensions in this catalog are subject to change without notice. If necessary, drawings can be provided. Other than the express written specifications contained in Nichicon’s catalog or other Nichicon literature, Nichicon makes no warranty, express, implied, or otherwise, in connection with these products, and all implied warranties, including the warranty of merchantability and fitness for a particular purpose, are disclaimed. Nichicon shall not be liable for incidental or consequential damages. Customer’s sole remedy in the event that Nichicon’s specifications are not met is to repair, replace, or refund the purchase price of the subject product.**

**CAUTION FOR SAFETY**

- Prior to ordering a product, please obtain a copy of specification from Nichicon and use the specification as a basis when designing equipment and incorporating our product. Nichicon admits no liability for equipment problems due to the lack of product specifications being confirmed.

**Note:** Please confirm when ordering because some series, sizes and specification of products may not be produced.
### Series Recommended for Use with Power Electronics

#### Aluminum electrolytic capacitors

<table>
<thead>
<tr>
<th>Performance categories</th>
<th>Dry film capacitors</th>
<th>Aluminum electrolytic capacitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>High voltage</td>
<td>High (Response corresponding to use)</td>
<td>&gt; -600V (LNX Series)</td>
</tr>
<tr>
<td>Maximum allowable working temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacitance range</td>
<td>High</td>
<td>&gt; to low capacity</td>
</tr>
<tr>
<td>Capacity unit price</td>
<td>High</td>
<td>&gt; to high capacity</td>
</tr>
<tr>
<td>Temperature resistance characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ripple current durability</td>
<td>Low</td>
<td>&gt; to high capacity</td>
</tr>
<tr>
<td>Capacitor fluid</td>
<td>Medium</td>
<td>&gt; to small capacity</td>
</tr>
<tr>
<td>Shape</td>
<td>Square</td>
<td>&gt; Basic shape is circular</td>
</tr>
<tr>
<td>Polarity</td>
<td>None</td>
<td>&gt; Available</td>
</tr>
</tbody>
</table>

#### Film capacitors

- **Resin-molded case**
  - Rectangular metal case
  - Snap-in terminal type
  - Screw terminal type
- **Circular aluminum case**
  - Snap-in terminal type
  - Screw terminal type

#### Electric double layer capacitors

- **Chip-type**
  - Snap-in terminal type
  - Screw terminal type
- **Screw terminal type**
  - Snap-in terminal type
  - Screw terminal type

### Power electronics-use capacitor series system diagram

- **Aluminum electrolytic capacitors**
- **Film capacitors**
- **Electric double layer capacitors**

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*Nichicon Power Electronics Application Catalog*
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 (ΔV) is great in equipment such as some 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

- **Location of short in the minus tab area**
- **Mica tab**
- **Cathode foil**

**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 QN Series snap in terminal type and QN 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.

**Reduced ESR – Separator improvement**

Use of reduced-ESR electrolytic 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 ΔT) by the capacitor. Also, by increasing the number of aluminum tabs we reduce metal resistance so as to reduce ESR.

**Saving space**

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

**Variety of storage uses**

- Standby power source
- Backup power source
- Emergency-use local power supply for essential utilities
- Stand-alone power source

### 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.

**Safety**

This capacitor is characterized by the lack of offset on the capacitor’s electrical function when an electric 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.

**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 layer 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
2. Backup power source
3. Emergency-use local power supply for essential utilities
4. Stand-alone power source
## Charge/discharge control circuit

### LGN
- Snap-in terminal type 105°C Smaller-Sized
  - **Product size**: ø6.3×9L to ø12.5×20L
  - **Rated voltage**: 6.3 to 100V
  - **Capacitance range**: 1 to 330μF
  - **Endurance**: 1,000 hours at 105°C

### LGM
- Snap-in terminal type 105°C Ultra-Smaller-Sized
  - **Product size**: ø4×5.8L to ø10×10L
  - **Rated voltage**: 16 to 50V
  - **Capacitance range**: 1 to 330μF
  - **Endurance**: 3,000 hours (ø6.3:1,500 hours) at 125°C

### LGW
- Snap-in terminal type 105°C products supporting high ripple current
  - **Product size**: ø8×6.2L to ø10×10L
  - **Rated voltage**: 6.3 to 50V
  - **Capacitance range**: 10 to 470μF
  - **Endurance**: 2,000 hours at 125°C (ø8×6.2L:1,000 hours)

### LGR
- Snap-in terminal type 105°C long-life products
  - **Product size**: ø12.5×20L to ø18×40L
  - **Rated voltage**: 25 to 100V
  - **Capacitance range**: 10μF to 20,000μF
  - **Endurance**: 12,000 hours at 105°C

### LNC
- Miniature screw terminal type 60°C supporting high ripple current
  - **Product size**: ø5×11L to ø18×31.5L
  - **Rated voltage**: 16 to 125V
  - **Capacitance range**: 1μF to 470μF
  - **Endurance**: 15,000 hours

### LNU
- Miniature screw terminal type 105°C miniature high-ripple-current product
  - **Product size**: ø10×9L:12,000 hours, ø8×11.5L, ø10×12.5L:15,000 hours
  - **Rated voltage**: 6.3 to 100V
  - **Capacitance range**: 1μF to 1,000μF
  - **Endurance**: ø10:5,000 hours, ø12.5 or more:10,000 hours

### EF
- Self-healing type with protective mechanisms attached
  - **Product size**: ø4 to 36×4 to 20×4
  - **Rated voltage**: 25 to 100V
  - **Capacitance range**: 1 to 330μF
  - **Endurance**: 5,000 hours at 105°C

## Power storage/load switching use

### JJD
- Snap-in terminal high energy density type
  - **Product size**: ø6.3×9L to ø12.5×20L
  - **Rated voltage**: 6.3 to 100V
  - **Capacitance range**: 1μF to 1,000μF
  - **Endurance**: 10,000 hours

### J JL
- Screw terminal high power density type
  - **Product size**: ø2 to ø7×2 to 30×4
  - **Rated voltage**: 25 to 100V
  - **Capacitance range**: 50μF to 2,200μF
  - **Endurance**: 2,000 hours at 125°C

## Control and signal circuit use

### UBT
- Highly reliable product (125°C product)
  - **Product size**: ø22×30L to ø35×45L
  - **Rated voltage**: 680 to 18,000μF
  - **Capacitance range**: 1µF to 20,000µF
  - **Endurance**: guaranteed for 10,000 hours

### UBW
- Highly reliable product (135°C product)
  - **Product size**: ø22×30L to ø35×45L
  - **Rated voltage**: 680 to 18,000μF
  - **Capacitance range**: 1µF to 20,000µF
  - **Endurance**: guaranteed for 15,000 hours

### UCD
- Chip type long-life product
  - **Product size**: ø12.5×20L to ø18×40L
  - **Rated voltage**: 450V
  - **Capacitance range**: 10μF to 1,000µF
  - **Endurance**: 1,000 hours at 105°C

## Ultra-Smaller-Sized

### UUL
- Chip type long-life product
  - **Product size**: ø6.3×9L to ø10×10L
  - **Rated voltage**: 25 to 100V
  - **Capacitance range**: 1 to 330μF
  - **Endurance**: 5,000 hours at 105°C

### UCE
- Chip type long-life product
  - **Product size**: ø12.5×20L to ø18×40L
  - **Rated voltage**: 450V
  - **Capacitance range**: 10μF to 1,000µF
  - **Endurance**: 1,000 hours at 105°C

### PCV
- Conductive polymer aluminum electrolytic capacitors
  - **Product size**: ø10×10 to ø22×22
  - **Rated voltage**: 125 to 450V
  - **Capacitance range**: 1μF to 1,000µF
  - **Endurance**: 1,000 hours at 125°C