

Nippon Chemi-Con
Aluminum Electrolytic Capacitors
Technical Information
~Target Application: On Board Charger~

June. 2023

Nippon Chemi-Con Corporation

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Technical Information

~ Aluminum Electrolytic Capacitors ~

E-Cap Radial Lead Type



**Large Capacitor Group
Products R&D Dept. II
R&D Headquarters
Nippon Chemi-Con Corporation**

Radial Type : OBC Application Road Map

U23C080614



OBC

【 High Cap & High Voltage 】

400v~450v
φ18×40L,160μF

KXQ

Add 350wv & 50L

Upgrade!

450wv
φ18×50L,200μF

KXQ

More Cap. & Low Temp.

450wv
φ18×50L,250μF

KX□

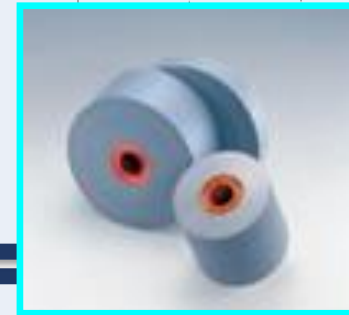
Add 500wv

500V~追加

500wv
φ18×50L,200μF

KX□

Upgrade!



Material development

High performance cathode foil

High Capacitance Anode foil

Low Resistance electrolyte

FY2023

FY2024

FY2025

FY2026

FY2027~

Radial Type : KXQ series For Automotive

U23C080614



NEW

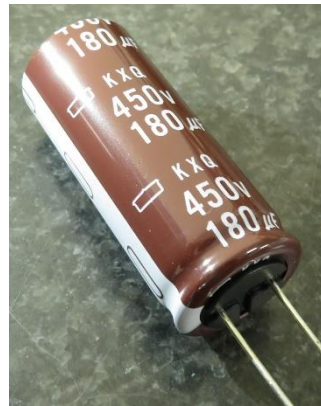
- Endurance 10k to 12khrs. at 105°C(with ripple)
- Rated voltage 400 to 450VV
- Case size $\phi 16 \times 20L$ to $\phi 18 \times 45L$
- AEC-Q200 compliant



➤ Higher capacity and higher ripple than KXJ.

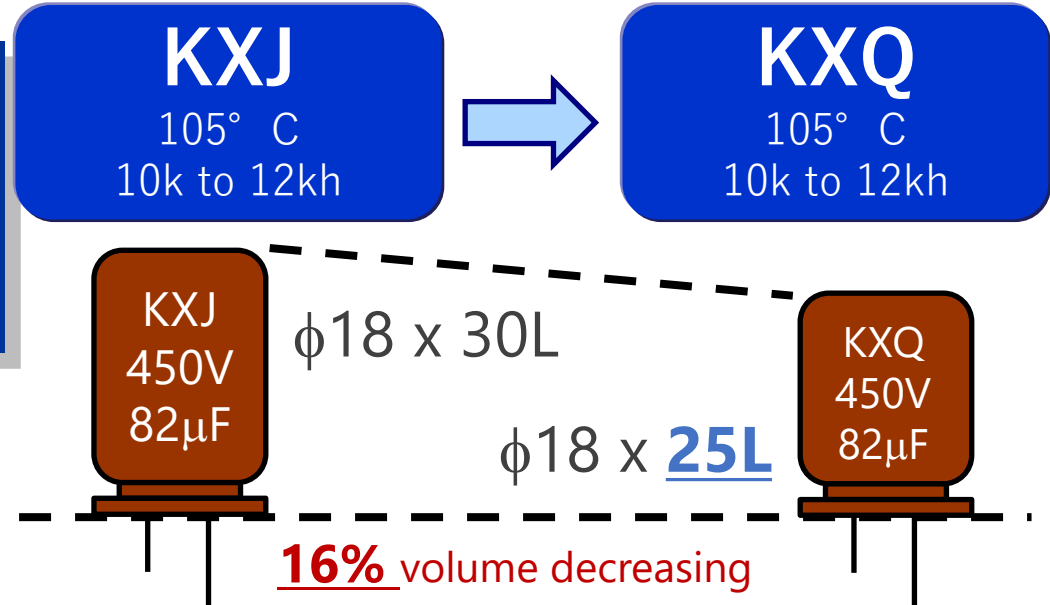
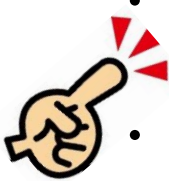
Recommend Application

- On board charger



Technical points

- Foil: (+) High cap Anode foil.
Extend the surface area of Anode foil.
- Separator: Thin/High density Separator.



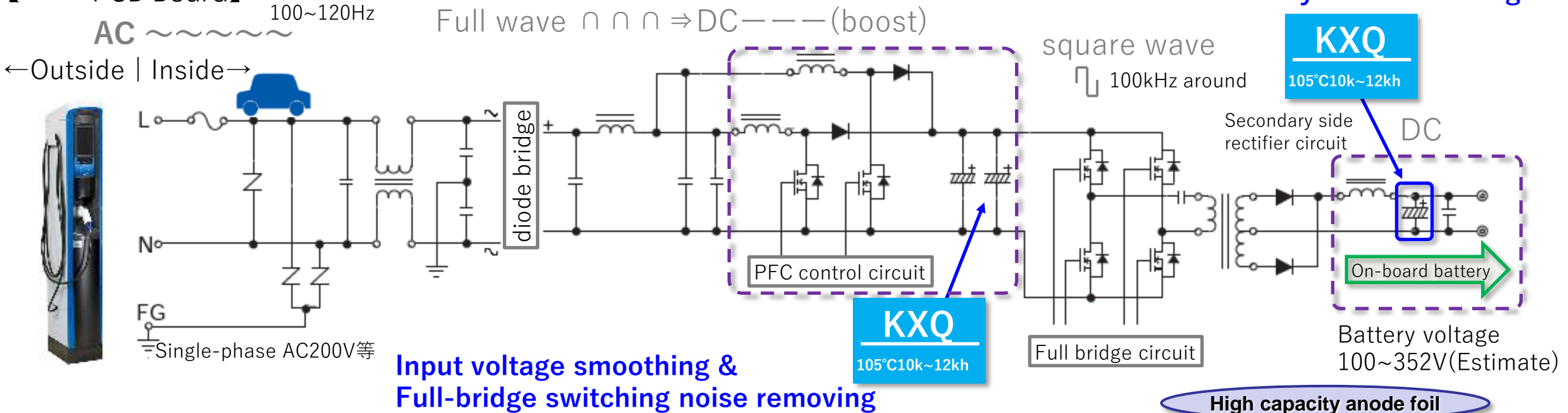
WV	ΦD x L [mm]	Cap. [µF]	Ripple current [mArms] (105°C,120Hz)
400	16 x 20	56	450
	18 x 40	180	1,020
420	16 x 25	68	510
	18 x 35.5	150	920
450	16 x 40	120	860
	18 x 45	180	1,000

Radial Type : KXQ series For Automotive

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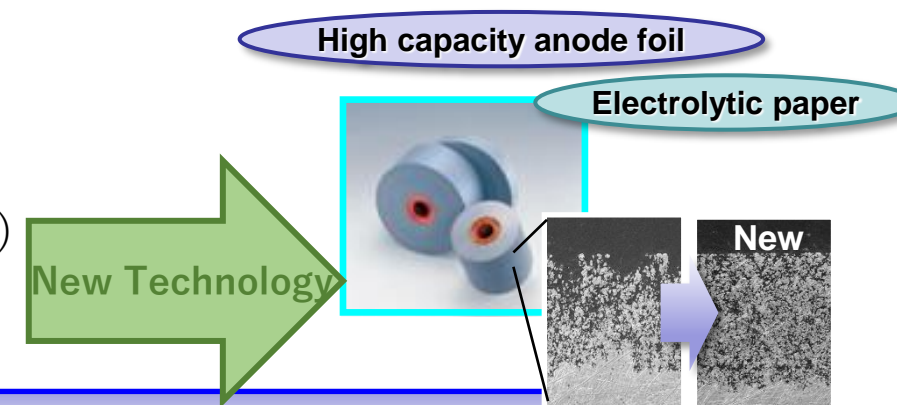


【OBC PCB Board】



【Estimated performance requirements】

- Not to break easily
⇒ Higher reliability of OBCs by making capacitors more reliable (higher voltage)
- Make more space inside the car & improve fuel efficiency
⇒ Miniaturization of OBCs by miniaturizing the capacitor (higher capacitance)



KXQ series has been developed to ensure high reliability and miniaturization, making it ideal for in-vehicle OBCs.

Advantages of using KXQ series

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Example of replacement: Item: CKVB451LIN561MA45Y × 3pcs ⇒ EKXQ451ELL181MM45S × 10pcs

KVB Layout

3.5cm × 10.5cm=36.8cm² ⇒ 3.6cm × 9.0cm=32.4cm²



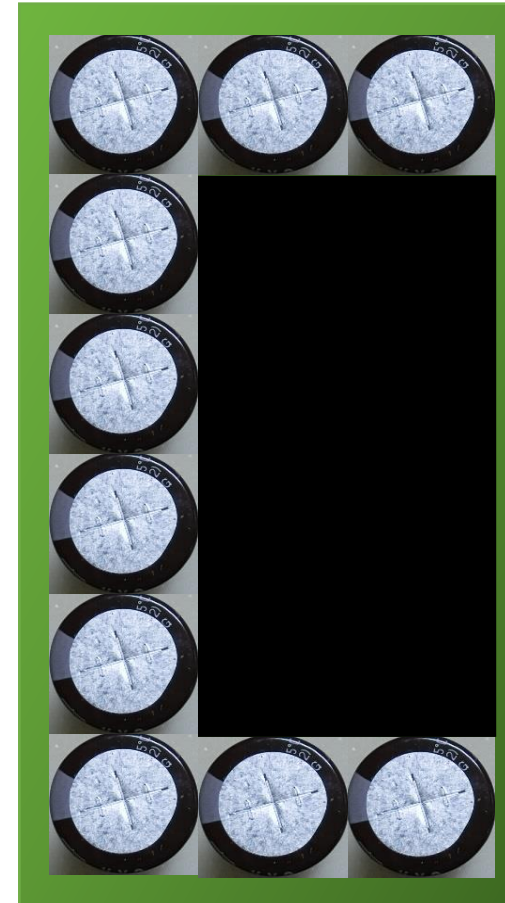
KXQ Layout

Mount Area reduced -12%



Allow free layout

KXQ Layout example①
(Free layout)



KXQ Layout example②
(Further space saving)

3.4cm × 9.0cm=30.6cm²



Technical Information ***~ Aluminum Electrolytic Capacitors ~***

E-Cap Snap-in type



**Large Capacitor Group
Products R&D Dept. I
R&D Headquarters
Nippon Chemi-Con Corporation**

Development Loadmap for E-Cap Snap-in type

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Automotive (Onboard Charger)

Mass production to start in 2021

AEC-Q200 qualified

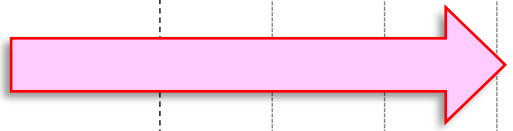
KVA
105° C 2,000H 450V780uF,35x50

KVB
105° C 3,000H 450V740uF,35x50

LVA
105° C 5,000H 450V710uF,35x50



Low temperature characteristic improvement (450V only)
+
Voltage range expansion



MP to start in 2024, Q2

KVB/LVA-Next
(450 to 500V)
105° C 3000H, 5000H

KVB-Next : 450V**820uF**,35x50
LVA-Next : 450V**770uF**,35x50



Low temperature characteristic improvement (475 and 500V)

MP to start in 2025, Q2

KVB/LVA-Next
(475 to 500V)
105° C 3000H, 5000H

CY2023

CY2024

CY2025

《For OBC》

KVA series (2,000hrs. at 105°C)

KVB series (3,000hrs. at 105°C)

LVA series (5,000hrs. at 105°C)

- Rated voltage 450V
- Case size $\phi 25.4 \times 25L$ to $\phi 35 \times 60L$
- AEC-Q200 compliant
- Low Temp at $-40^{\circ}C$

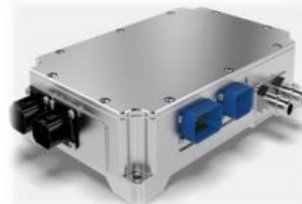
➤ **AEC-Q200 qualified**

➤ **Enhanced Anti-vibration design**

($49m/s^2$: 5G, with the main body fixed)

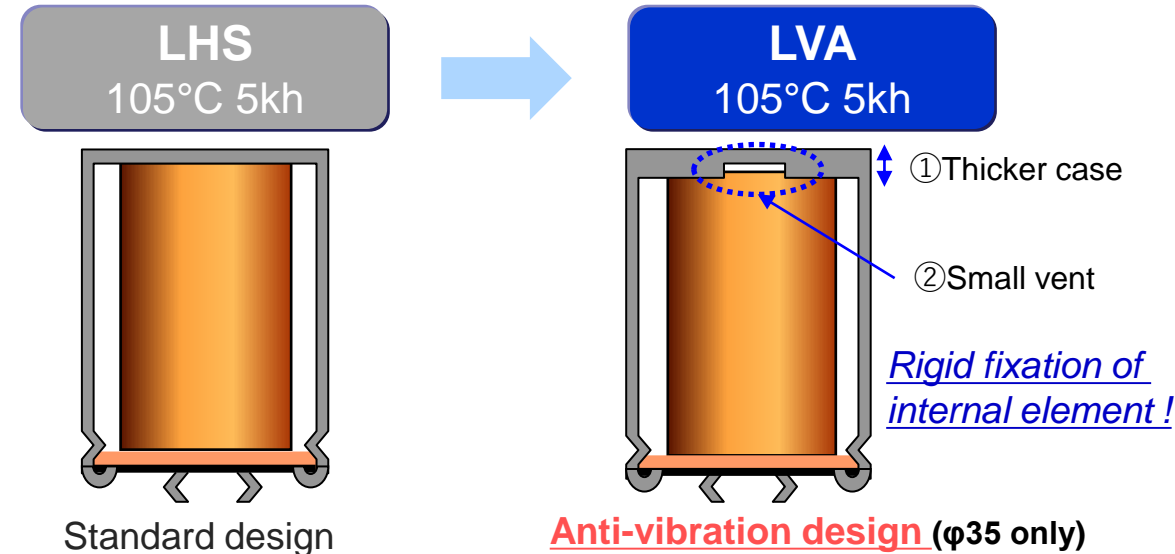
Recommend Application

- On board charger



Technical points

- Case : Thicker case top and small vent



V [V]	$\Phi D \times L$ [mm]	LHS		LVA	
		Cap. [μF]	Ripple current [Arms]	Cap. [μF]	Ripple current [Arms]
450	30 × 25	220	1.15	210	1.13
	30 × 30	270	1.29	280	1.31
	30 × 35	330	1.46	340	1.48
	30 × 40	390	1.63	410	1.67
	35 × 45	560	1.99	620	2.06
	35 × 50	680	2.22	710	2.25

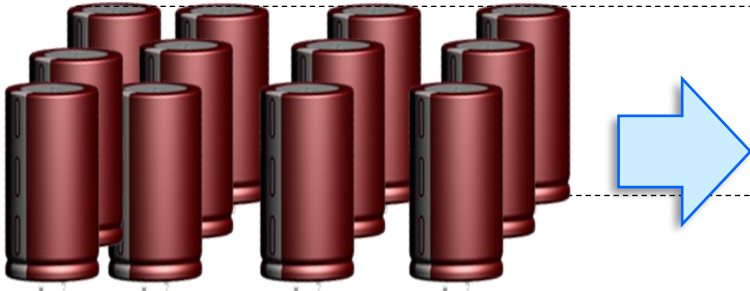
New proposal for higher capacitance and compact design

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Case Study : LXS 450V560 μ F, D35 \times 60L, 2.22Arms/5000hrs

<Current state>



12 parallel use

Product height : **62.5Lmax.**
Total Cap : **6,720 μ F**
Allowance ripple current :
26.6Arms /105 $^{\circ}$ C,120Hz

<Proposal-1, Utilizing LVA> ELVA451VSN891MA60S



10 parallel use

**Reduction of
2 capacitors**

Product height : **62.5Lmax.**
Total Cap : **8,900 μ F**
Allowance ripple current :
26.2Arms /105 $^{\circ}$ C,120Hz

Customer's benefit

Reduction of capacitors:

12pcs \rightarrow 10pcs

Reduction in Weight

\Rightarrow Ref. TTL 829g \rightarrow 690g (17% down)

<Proposal-2, Utilizing LVA > ELVA451VSN711MA50S



12 parallel use

**16%
Down !**

Product height : **52.5Lmax.**
Total Cap : **8,520 μ F**
Allowance ripple current :
27.0Arms /105 $^{\circ}$ C,120Hz

Customer's Benefit

Reduction in the size

60mm \rightarrow 50mm

Reduction in weight

\Rightarrow Ref. TTL 995g \rightarrow 853g (16% down)

Technical Information

~ Nanocrystalline Coil and Varistors ~



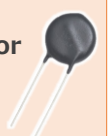
On Board Charger Circuit Outline

✓ Ideal for OBC circuit

*Interleaved PFC

Noncombustible
Metal Oxide Varistor

SV Series



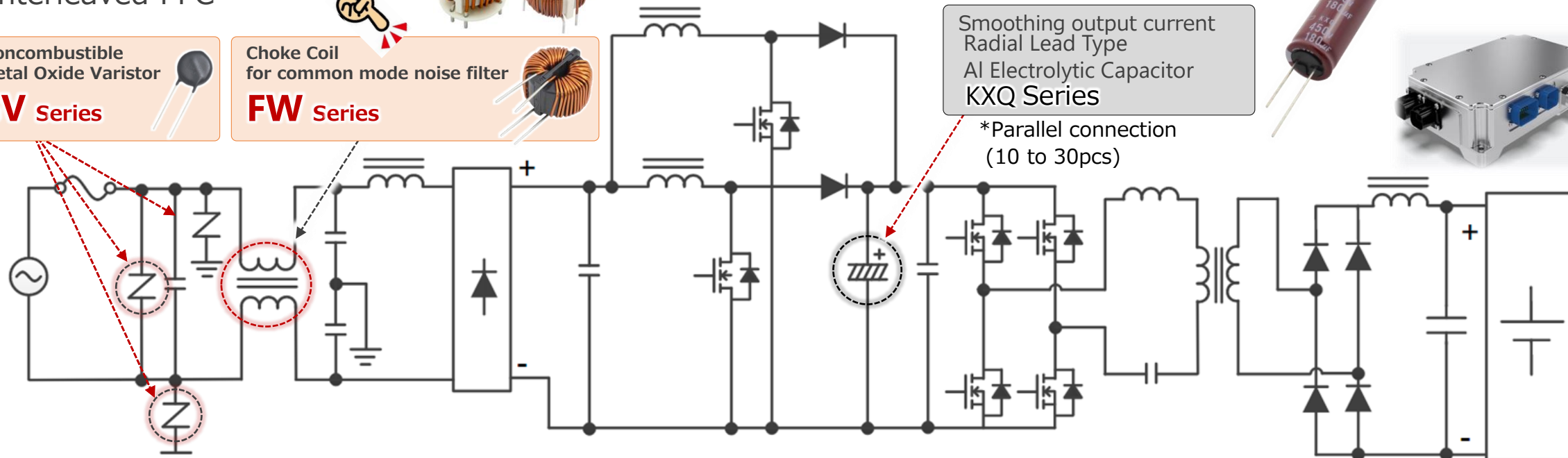
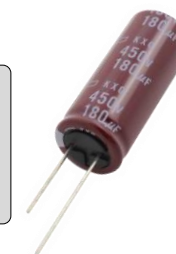
Choke Coil
for common mode noise filter

FW Series



Smoothing output current
Radial Lead Type
Al Electrolytic Capacitor
KXQ Series

*Parallel connection
(10 to 30pcs)





FW series Nanocrystalline Alloy : Common Mode

- Inductance 3.5 to 38mH at 10kHz
- Inductance 1.0 to 11.5mH at 100kHz
- Rated voltage 250 to 700V
- Operating temperature -40 to 130°C



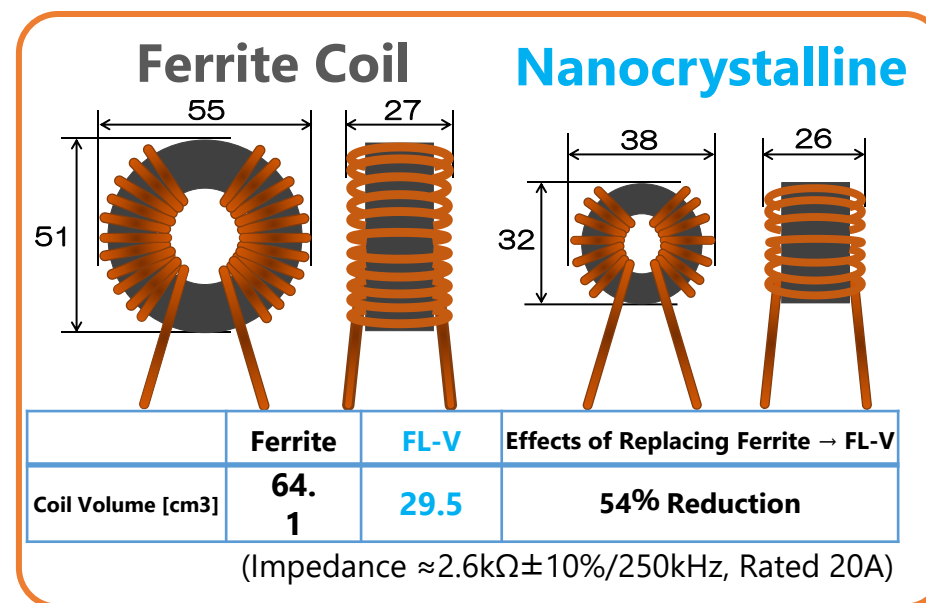
● Features

- ✓ 1.3 to 1.5 times Higher Inductance at 10kHz than FL-V series
- ✓ **Magnetic Permeability (100kHz): 31,000 μ**
- ✓ Curie Temperature: 570°C

● Applications

- ✓ AC and DC Common Mode Filter
- ✓ **Automotive · Medical · Base Stations · Solar Power** etc.
- ✓ Solves High Temp. · 24/7 Operation · Space-saving requirements

● Comparison (Reference)



● Related Series



SV series : Non-flammable & Little scattering

- Varistor voltage 22 to 1100V
- High temp. operating 125°C 1,000hours
- Damp heat operating 85°C85% 1,000 hours
- Size range: Dia. 5 to 20mm
- UL, CSA and VDE recognized components

Features

- **Non- flammable** under even over voltage
- **Updated Environmental characteristics**
(Operating max. 125°C/Storage max. 150°C)

Recommend Application

- On board charger

Non-flammable :
SV series
(Silicon resin coated)

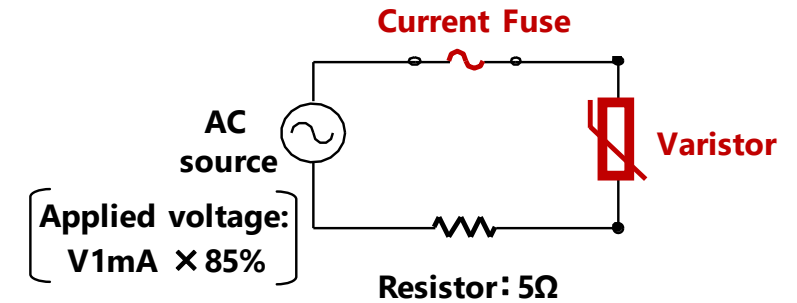


Fig. Destruction test circuit.

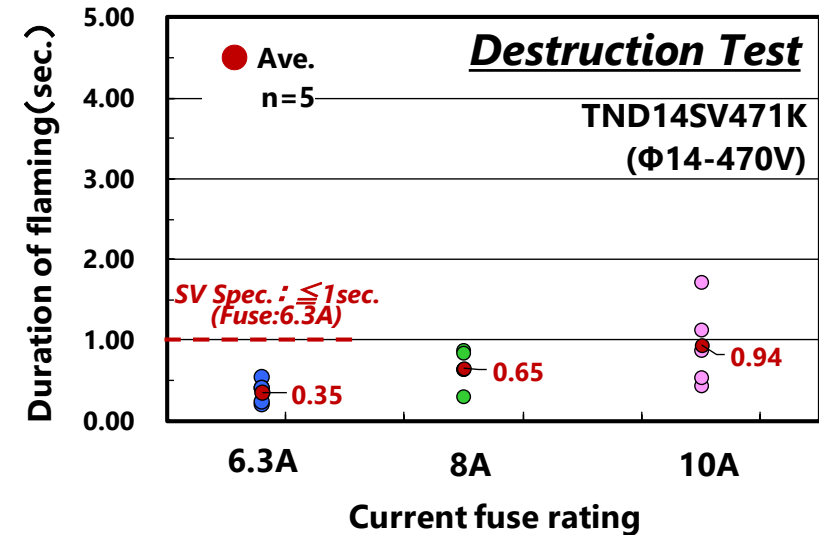


Fig. Duration of flaming by rating of current fuse.