CAT. 8200B

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All You Need and More, Right Away CanDo!

Aluminum Solid Electrolytic Capacitors with Functional Polymer

FPCAP

2012

NICHICON CORPORATION / FPCAP ELECTRONICS (SUZHOU) CO., LTD.

CONTENTS

FPCAP *Functional Polymer Aluminum Solid Electrolytic Capacitors*

Critical Precautions on FPCAP itself

1. Polarity

The FPCAP has polarity. Consequently, make sure polarity is never reversed when using.
If polarity is reversed, leakage current could increase or lifetime could decrease.

2. Applied Voltage

Under no circumstances can reverse voltage be applied. It may cause a short circuit.

3. Sudden charge and discharge

Keep sudden charge and discharge to a minimum. It may create a short circuit or cause high leakage current.
In this case, it is recommended to use a protection circuit in order to maintain high reliability.
Regardless, using protection circuit to ensure reliability is recommended when the rush current value exceeds 10A.
Please make sure to insert a protection resistor of about 1kΩ for charge and discharge when measuring the leakage current.

4. Soldering

The soldering conditions must be kept within the permissible range prescribed in the catalog specification.
If the specification is not kept, there is the possibility of abnormal appearance and abnormal leakage current and reduced capacitance.

5. Installation on PC board

When designing the layout of your PC board using the FPCAP please take into consideration the standard mounting specifications.
The FPCAP can not be able to be mounted on a PC board if there is insufficient space.

6. Directions for use in circuits

Since leakage current fluctuations can occur during the soldering process the FPCAP cannot be used in the following circuits.

(1) High impedance voltage retention circuits

(2) Coupling circuits

(3) Time constant circuits

(4) Circuits greatly affected by leakage current

(5) Connecting two or more FPCAP in series

General Precautions at Designing, for Use and Handling

1. Circuit design precautions

(1) Check the rated performance
After checking the operation and installation environments, design the circuit so that it falls within the rated performance range stipulated in the catalog specification.

(2) Operating temperature and ripple current
a) Set the operating temperature so that it falls within the range stipulated in the catalog specification.
b) Do not apply current that exceeds the allowable ripple current in the catalog.

(3) Leakage current
Even when the soldering conditions fall within the range of the catalog specification, the leakage current increases slightly.
It also increases slightly during high temperature no-load, moisture-proof no-load and temperature cycling tests with no voltage applied.
In cases such as these, leakage current will decrease by applying voltage in conditions below the maximum operating temperature.

(4) Applied voltage Considerations
a) Make sure the sum of the peak DC voltage and ripple voltage values does not exceed the rated voltage.
b) Please do not apply the reverse voltage to FPCAP.
c) When the DC voltage is low, please check whether the peak value of ripple voltage does not become a reverse voltage.

(5) Reduction of failure stress
The main failure mode of the FPCAP is in the open mode primarily caused by an electrostatic capacitance drop.
Random short circuit mode failures occur rarely.
The time it takes to reach the failure mode can be extended by using the FPCAP with reduced ambient temperature, ripple current and applied voltage.

(6) Capacitor insulation
a) Insulation is not guaranteed.
b) Be sure to completely separate the case, negative electrode terminal and positive electrode terminal from adjacent components and PC board traces.

(7) Operating environment
Do not use the FPCAP in the following environments.
a) Places where it can come into direct contact with water or salt water and places where condensation may form.
b) Places filled with noxious gasses such as: hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.
c) Places exposed to ozone, ultraviolet rays and radiation.
d) Where severe vibration or shock which exceeds the condition specified in the specification sheets.

(8) Assembly Conditions Considerations
In designing a circuit, the following conditions should be checked before the FPCAP is mounted on the PC board.
a) The pitch and diameter of PCB holes to which the FPCAP is mounted, shall be designed in conformance with the dimensional tolerance stipulated in the catalog specifications.

(9) PC board
Avoid locating heat-generating components around the FPCAP and on the underside of the PC board under the FPCAP.

(10) Parallel connection
When used in a parallel connection with another capacitor, carefully select the type of capacitor.

(11) Other
a) Electrical characteristics are affected by fluctuations in temperature and frequency.
b) When mounting the **FPCAP** on a double-sided PC board, design the board so that extra PC board holes are not located underneath the **FPCAP**.

2. Mounting precautions

(1) Things to know before mounting

a) Do not reuse the FPCAP that has already been assembled in a device and energized.
Excluding the FPCAP that has been removed for measuring electrical characteristics during a periodic inspection, they cannot be reused.

b) Leakage current may increase if the part has been stored for a long period of time.
In this case, use after voltage treatment under the rated voltage.

(2) Mounting-1

a) Mount after checking the capacitance and the rated voltage.

b) Mount after checking the polarity.

c) Do not drop on the floor and do not use parts that have been dropped.

d) Do not deform and then mount.

(3) Mounting-2

a) Mount after checking the match between the lead pitch and the PC board holes pitch.

b) When an automatic insertion equipment is used to clinch the lead wires, make sure it is set correctly.

c) Be careful of the shock force that can be produced by the automatic insertion equipment.

d) Do not apply excessive external force to the lead wires, the FPCAP itself, or the electrode terminals.

(4) Soldering with a soldering iron

a) Set the soldering conditions (temperature, time) so that they fall within the range stipulated by the catalog specification.

b) When the lead wire terminal must be processed because the terminal spacing and the PC board holes spacing do not match, process it before soldering so that no stress is applied to the FPCAP itself.

c) Do not subject the FPCAP itself to excessive stress when soldering with a soldering iron.

d) When a soldering iron is used to repair the FPCAP that has already been soldered once and needs to be removed, do it after the solder has been completely melted so that no stress is applied to the FPCAP terminals.

e) Do not let the tip of the soldering iron touch the FPCAP itself.

f) The amount of leakage current after soldering may increase a slightly (from a few μA to several hundred μA) depending on the soldering condition (preheating and solder temperature and time, PC board material and thickness, etc.)
The leakage current can be reduced by applying voltage.

(5) Flow soldering (Radial lead type)

a) Never submerge the FPCAP in molten solder. Use the PC board to protect the FPCAP and only solder the opposite side of the board that the FPCAP is mounted on.

b) Set the soldering conditions (soldering temperature, terminal submersion time) so that they fall within the range stipulated by the catalog specification. The amount of leakage current after soldering may increase slightly (from a few μA to several hundred μA) depending on the soldering conditions (preheating and solder temperature and time, PC board material and thickness, etc.). The leakage current can be reduced through self-repair by applying voltage.

c) Take care that flux does not adhere to any place other than the terminals.

d) When soldering, take care that other components do not fall over and touch the FPCAP.

e) Flow soldering under extremely abnormal conditions may reduce the capacitance of products before or after soldering.

(6) Reflow soldering (SMD type)

Do not use reflow soldering for Radial lead type (Through Hole).

a) Never submerge the FPCAP in molten solder. Use the PC board to protect the FPCAP and only solder the opposite side of the board that the FPCAP is mounted on.

b) Set the soldering conditions (soldering temperature, terminal submersion time) so that they fall within the range stipulated by the catalog specification. The amount of leakage current after soldering may increase slightly (from a few μA to several hundred μA) depending on the soldering conditions (preheating and solder temperature and time, PC board material and thickness, etc.). The leakage current can be reduced through self-repair by applying voltage.

c) Take care that flux does not adhere to any place other than the terminals.

d) When soldering, take care that other components do not fall over and touch the FPCAP.

e) Reflow soldering under extremely abnormal conditions may reduce the capacitance of products before or after soldering.

f) Do not use VPS (Vapor Phase Soldering).

(7) Handling after soldering
a) Do not tilt, bend or twist the FPCAP after it has been soldered on the PC board.
b) Do not use the FPCAP as a handle to move the PC board after it has been attached to it.
c) Do not bump the FPCAP with objects after it has been soldered to the PC board. Make sure the FPCAP does not touch other PC boards or components.
d) Do not subject to excessive stress after it has been soldered to the PC board.

(8) Washing the PC board
Check the following items before washing the PC board with these detergents; high quality alcohol-based cleaning fluid such as Pine-α ST-100S, Clean-thru 750H, 750L, 750K, or Techno Care FRW14 through 17; or detergents including substitute Freon such as AK-225AES and IPA.
a) Use immersion or ultrasonic wave to clean for a total of less than five minutes.
b) The temperature of the cleaning fluid should be less than 60°C.
c) Watch for contamination of the detergent (conductivity, pH, specific gravity, water content, etc.).
d) After cleaning do not store in a location subject to gases from the cleaning fluid or in an airtight container. Dry the PC board and the FPCAP using hot air (less than the maximum operating temperature).
e) Please contact our company for details about detergents and cleaning methods, and about detergents other than those listed above.

(9) Fixatives and coatings
a) Select appropriate material for the FPCAP marking material and sealant. In particular, make sure the fixative, coating and thinner do not contain acetone or toluene.
b) Before applying a fixative or coating, completely remove any flux residue and foreign matter from the area where the PC board and the FPCAP are to be joined together.
c) Allow any detergent to dry before applying the fixative or coating.
d) Please contact our company for fixative and coating heat curing conditions.

3. Precautions with completed board

(1) Do not directly touch the FPCAP terminals.

(2) Do not use electric conductors to cause a short circuit between the FPCAP terminals.
Do not subject the FPCAP to conductive solutions.

(3) Check the installation environment of the board on which the FPCAP is mounted.

(4) Aging of the completed board, please use the voltage below the rated voltage of the capacitor.

(5) It is recommended that the board be used at room temperature and in ordinary humidity.
For details, refer to the Operating Precaution Guidelines for the EIAJ RCR-2367C. (Safety Application Guide for fixed aluminum electrolytic capacitors for use in electronic equipment.)

4. If trouble should occur

(1) In the event that a short circuit causes the current to become relatively small (Radial lead type : less than approximately 3A for φ10 and less than approximately 1A for φ6.3), the FPCAP itself will generate some heat, but the appearance will not be affected even when electricity is supplied continuously. However, if there is a short circuit and the current value exceeds the above mentioned values, the temperature inside the FPCAP will increase.
When the temperature exceeds approximately 200°C the internal pressure will increase, and an odorous gas will be released. In this case, do not allow contact with your face and hands.

(2) If a short circuit occurs and an odorous gas is released, either turn off the device's main power or unplug the power cord from the outlet.

(3) If a short circuit should occur, it may take anywhere from a few seconds to a few minutes until an odorous gas develops, depending on the conditions. Design the device so that a power protection circuit works during this time period.

(4) If the gas gets in your eyes, rinse them immediately. If it has been inhaled, gargle with water immediately.

(5) When the polymer or gas of the polymer comes in contact with your skin, wash it off with soap and water.

(6) The electrolyte, separator paper, rubber and tube used in the FPCAP are all combustible. When the current value is extraordinarily high during a short circuit, and assuming the worst possibility, the shorted-out section in the lead wire or inside the capacitor could create a spark, and cause the resin or tube to catch fire.
Give due consideration to the capacitors mounting methods, mounting positions, pattern design etc.

5. Storage conditions

Do not store capacitors without load more than a year because of potential increased leakage current.

(1) Do not store at high temperatures and high humidity. Store it in a location that is not subject to direct sunlight and that has low temperatures and humidity (generally, temperatures between 5 and 35ºC and a relative humidity of 75% or less).
(SMD type VA/VB series : Temperatures between 5 and 30ºC and a relative humidity of 70% or less)

(2) Storage period (SMD type VA/VB series)
Store in an aluminum laminated bag.
Before opening : 1 year
After opening : 1 week (Use up all the products after having opened out. Surplus products should be put into the aluminum laminated bag, and seal up.)

(3) Baking conditions (SMD type VA/VB series)
When you use it exceeding a storage term, please carry out and use baking by the following conditions.
Temperature: 60(+0, -5) ºC
Time: 168hours (only one time)

(4) Store in an airtight plastic bag to keep the leads in good condition.

(5) To keep the leads in good condition, store lead-type the FPCAP for no more than one year.

(6) Do not store in places where water, salt water or oil can directly fall on them, or places where condensation may form.

(7) Do not store in places filled with noxious gas (hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.).

(8) Do not store in places exposed to ozone, ultraviolet rays and radiation.

6. Disposal

Please treat the FPCAP as industrial waste when needing to dispose of the FPCAP.

For details, refer to the Operating Precaution Guidelines for the EIAJ RCR-2367C. (Safety Application Guide for fixed aluminum electrolytic capacitors for use in electronic equipment.)

Products List

Classification	Series	Note	Rated Voltage Range	Capacitance Range	Categorical Max. Temp. and Endurance	Pages
Radial Lead Type	NS	Standard	4.0 to 25V	10 to 1200μF	105ºC 2000Hrs	8
	R7	Low ESR	2.5 to 16V	68 to 1500μF	105ºC 2000Hrs	10
	R5	Ultra-Low ESR	2.5 to 6.3V	390 to 1500μF	105ºC 2000Hrs	12
UPGRADE	L8	Low ESR and Low Profile (φ8)	2.5 to 35V	100 to 1500μF	105ºC 2000/5000Hrs	14
	E5	Ultra-Low ESR and Low Profile (φ8)	2.5 to 4.0V	560 to 820μF	105ºC 2000Hrs	16
UPGRADE	S8	Low ESR/ESL and Low Profile (φ6.3)	2.5 to 16V	100 to 1200μF	105ºC 2000/5000Hrs	18
	F8	Low ESR/ESL and Low Profile (φ5)	2.5 to 6.3V	100 to 560μF	105ºC 2000Hrs	20
UPGRADE	NU	Large Capacitance	2.5 to 63V	10 to 2700μF	105ºC 2000/5000Hrs	22
UPGRADE	NE	Large Capacitance	2.5 to 16V	100 to 1200μF	105ºC 2000Hrs	24
NEW	S6	Miniature Sized Large Capacitance	2.5 to 25V	33 to 560μF	105ºC 2000Hrs	26
	HT	High Temperature (125ºC)	6.3 to 20V	150 to 820μF	125ºC 1000Hrs	28
SMD Type	PS/PA	Standard (φ6.3 , φ8 , φ10)	2.5 to 63V	8.2 to 1500μF	105ºC 2000Hrs	30
UPGRADE	HS/HA	Large Capacitance (φ8)	2.5 to 35V	100 to 1500μF	105ºC 2000Hrs	32
UPGRADE	SS/SA/SB	Large Capacitance (φ6.3)	2.5 to 25V	10 to 560μF	105ºC 2000Hrs	34
UPGRADE	FS	Large Capacitance (φ4 , φ5)	2.5 to 25V	10 to 180μF	105ºC 2000Hrs	36
UPGRADE	SL	Low Profile (φ6.3)	2.5 to 25V	15 to 330μF	105ºC 2000Hrs	38
NEW	VA/VB	Molded Chip (7.3×4.3×2.8)	2.5 to 25V	15 to 220μF	105ºC 1000Hrs	40

Green Products

Corresponding to the environmental Requirement

Classification	Lead-free	RoHS compliance	Halogen-free
Radial Lead Type	○	○	○
SMD Type	○	○	○

○ : Completed

System Diagram for FPCAP

Radial lead type

Standard
NS series
φ6.3×7 / 10 φ8×11.5, φ10×12.5
●4.0 to 25V
●10 to 1200μF
●105ºC, 2000h

Low ESR

ESR 7mΩ
R7 series
φ8×11.5, φ10×12.5
●2.5 to 16V
●68 to 1500μF
●105ºC, 2000h

Low ESR

ESR 5mΩ
R5 series
φ8×11.5, φ10×2.5
●2.5 to 6.3V
●390 to 1500μF
●105ºC, 2000h

Large Cap.

Low Profile

Low Profile

Large Cap.
NU series
φ4×5, φ6.3×10, φ8×11.5, φ10×12.5
●2.5 to 63V
●10 to 2700μF
●105ºC, 2000h / 5000h
UPGRADE

Low Profile
L8 series
φ8×8
●2.5 to 35V
●100 to 1500μF
●105ºC, 2000h / 5000h
UPGRADE

Low ESR

ESR 5mΩ
E5 series
φ8×8
●2.5 to 4V
●560 to 820μF
●105ºC, 2000h

Large Cap.

Low ESL

Large Cap.
NE series
φ5×8 /10,φ6.3×10,φ8×6 to11.5, φ10×12.5
●2.5 to 16V
●100 to 1200μF
●105ºC, 2000h
UPGRADE

Low ESL / Large Cap.
S8 series
φ6.3×8
●2.5 to 16V
●100 to 1200μF
●105ºC, 2000h / 5000h
UPGRADE

Large Cap.

Low ESL

Miniature Large Cap.
S6 series
φ6.3×5, φ6.3×6
●2.5 to 25V
●33 to 560μF
●105ºC, 2000h
NEW

Low ESL / Large Cap.
F8 series
φ5×8
●2.5 to 6.3V
●100 to 560μF
●105ºC, 2000h

High Temperature

Guarantee 125ºC
HT series
φ8×11.5, φ10×12.5
●6.3 to 20V
●150 to 820μF
●125ºC, 1000h

SMD type

Standard
PS series
φ6.3×5.7, φ8×6.7 / 11.7, φ10×7.7 / 12.4
●2.5 to 63V
●8.2 to 1500μF
●105ºC, 2000h
UPGRADE

Low ESR

Low ESR
PA series
φ6.3×5.7, φ8×11.7, φ10× 7.7
●4.0 to 16V
●39 to 560μF
●105ºC, 2000h
UPGRADE

Molded Chip NEW

Standard / Low ESR
VA/VB series
7.3×4.3×2.8
●2.5 to 25V
●15 to 220μF
●105ºC, 1000h

Large Cap.

Large Cap.
HS series
φ8×6.7, φ8×7.7, φ8×8.7, φ8×11.7
●2.5 to 35V
●100 to 1500μF
●105ºC, 2000h
UPGRADE

Low ESR

Low ESR
HA series
φ8×6.7, φ8×7.7
●2.5 to 16V
●150 to 1000μF
●105ºC, 2000h

Large Cap.

Large Cap.
SS series
φ6.3×5.7
●2.5 to 25V
●10 to 560μF
●105ºC, 2000h
UPGRADE

Low ESR

Low ESR
SA series
φ6.3×5.7, φ6.3×7.7
●2.5 to 16V
●100 to 560μF
●105ºC, 2000h

Low ESR

Low ESR
SB series
φ6.3×5.7
●2.5 to 6.3V
●220 to 560μF
●105ºC, 2000h

Large Cap.

Low Profile

Large Cap.
FS series
φ4×5.2, φ5×5.7
●2.5 to 25V
●10 to 180μF
●105ºC, 2000h
UPGRADE

Low Profile
SL series
φ6.3×4.2
●2.5 to 25V
●15 to 330μF
●105ºC, 2000h
UPGRADE

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

NS series

Low ESR

Lead-free | RoHS Compliance

Standard

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

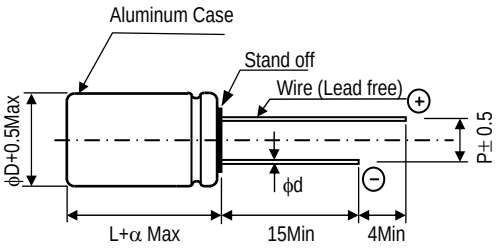
Items		Characteristics
		NS
Operating Temp. Range		-55 to +105°C
Rated Voltage Range		4.0 to 25V·DC
Capacitance Range		10 to 1200μF
Capacitance Tolerance		±20% (M)
Endurance	Condition	105°C 2000Hrs at rated voltage
	Capacitance	Within ±20% of the value before test
	Leakage Current	Not to exceed the value specified
	tan δ	Not to exceed 150% of the value specified
Failure Rate		0.1% / 1000Hrs. Max (60%CL)

●Size List

[φD×L]

Cap. [μF] \ R.V (S.V.) [V]	4.0 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)	20 (23)	25 (28.7)
10						6.3×7
15					6.3×7	6.3×10
22				6.3×7	6.3×7	8×11.5
33			6.3×7	6.3×7	6.3×10	10×12.5
47		6.3×7		6.3×10	8×11.5	10×12.5
68			6.3×10	8×11.5	8×11.5	
100			8×11.5	8×11.5	10×12.5	10×12.5
150		8×11.5		10×12.5		
180				8×11.5		
220		8×11.5	10×12.5			
330		10×12.5		10×12.5		
390		8×11.5				
470			10×12.5			
560	8×11.5					
680		10×12.5				
820	10×12.5	10×12.5				
1000		10×12.5				
1200	10×12.5					

●Dimensions



[Unit : mm]

φD×L	φd	P	α
6.3×7	0.45	2.5	1.0
6.3×10	0.5	2.5	1.0
8×11.5	0.6	3.5	1.5
10×12.5	0.6	5.0	1.5

●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number NICHICON	Part Number FPCAP	Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
4.0	560	RNS0G561MDN1□□	FP-4R0RE561M-NS□□	336	0.08	10	5230	8 × 11.5
	820	RNS0G821MDN1□□	FP-4R0RE821M-NS□□	492	0.08	10	5500	10 × 12.5
	1200	RNS0G122MDN1□□	FP-4R0RE122M-NS□□	720	0.15	10	5500	10 × 12.5
6.3	47	RNS0J470MDS1□□	FP-6R3RE470M-NS□□	50	0.07	42	2050	6.3 × 7
	150	RNS0J151MDN1□□	FP-6R3RE151M-NS□□	142	0.07	21	3900	8 × 11.5
	220	RNS0J221MDN1□□	FP-6R3RE221M-NS□□	208	0.07	21	3900	8 × 11.5
	330	RNS0J331MDN1□□	FP-6R3RE331M-NS□□	312	0.07	10	5500	10 × 12.5
	390	RNS0J391MDN1□□	FP-6R3RE391M-NS□□	369	0.08	10	5230	8 × 11.5
	680	RNS0J681MDN1□□	FP-6R3RE681M-NS□□	643	0.08	10	5500	10 × 12.5
	820	RNS0J821MDN1□□	FP-6R3RE821M-NS□□	775	0.12	10	5500	10 × 12.5
	1000	RNS0J102MDN1□□	FP-6R3RE102M-NS□□	945	0.12	10	5500	10 × 12.5
10	33	RNS1A330MDS1□□	FP-010RE330M-NS□□	50	0.07	49	1900	6.3 × 7
	68	RNS1A680MDS1□□	FP-010RE680M-NS□□	102	0.07	35	2650	6.3 × 10
	100	RNS1A101MDN1□□	FP-010RE101M-NS□□	150	0.07	21	3900	8 × 11.5
	220	RNS1A221MDN1□□	FP-010RE221M-NS□□	330	0.07	10	5500	10 × 12.5
	470	RNS1A471MDN1□□	FP-010RE471M-NS□□	705	0.08	10	5500	10 × 12.5
16	22	RNS1C220MDS1□□	FP-016RE220M-NS□□	53	0.06	49	1900	6.3 × 7
	33	RNS1C330MDS1□□	FP-016RE330M-NS□□	79	0.06	49	1900	6.3 × 7
	47	RNS1C470MDS1□□	FP-016RE470M-NS□□	113	0.06	42	2400	6.3 × 10
	68	RNS1C680MDN1□□	FP-016RE680M-NS□□	163	0.06	25	3600	8 × 11.5
	100	RNS1C101MDN1□□	FP-016RE101M-NS□□	240	0.06	21	3900	8 × 11.5
	150	RNS1C151MDN1□□	FP-016RE151M-NS□□	360	0.06	10	5500	10 × 12.5
	180	RNS1C181MDN1□□	FP-016RE181M-NS□□	432	0.08	16	4700	8 × 11.5
	330	RNS1C331MDN1□□	FP-016RE331M-NS□□	792	0.08	10	5500	10 × 12.5
20	15	RNS1D150MDS1□□	FP-020RE150M-NS□□	50	0.06	63	1700	6.3 × 7
	22	RNS1D220MDS1□□	FP-020RE220M-NS□□	66	0.06	49	1900	6.3 × 7
	33	RNS1D330MDS1□□	FP-020RE330M-NS□□	99	0.06	49	2200	6.3 × 10
	47	RNS1D470MDN1□□	FP-020RE470M-NS□□	141	0.06	28	3400	8 × 11.5
	68	RNS1D680MDN1□□	FP-020RE680M-NS□□	204	0.06	25	3600	8 × 11.5
	100	RNS1D101MDN1□□	FP-020RE101M-NS□□	300	0.06	15	4500	10 × 12.5
25	10	RNS1E100MDS1□□	FP-025RE100M-NS□□	50	0.06	63	1700	6.3 × 7
	15	RNS1E150MDS1□□	FP-025RE150M-NS□□	75	0.06	49	2200	6.3 × 10
	22	RNS1E220MDN1□□	FP-025RE220M-NS□□	110	0.06	28	3400	8 × 11.5
	33	RNS1E330MDN1□□	FP-025RE330M-NS□□	165	0.06	20	3800	10 × 12.5
	47	RNS1E470MDN1□□	FP-025RE470M-NS□□	235	0.06	20	3800	10 × 12.5
	100	RNS1E101MDN1□□	FP-025RE101M-NS□□	500	0.08	15	4500	10 × 12.5

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Part Number (EX) 16V, 100μF

Nichicon P/N

R	NS	1C	101	M	DN	1	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Lead Forming

Lead Forming:
CG: Cut lead (Bulk)
JX: φ6.3x10 2.5mm pitch taping
JT: φ6.3x7, 2.5mm pitch taping
KX: φ8, 3.5mm pitch taping
PX: φ6.3&φ8, 5.0mm pitch taping
PH: φ10, 5.0mm pitch taping

FPCAP P/N

FP	—	016	RE	101	M	—	NS	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Lead Forming	Control code

Lead Forming:
R: Long lead (Bulk)
CG: Cut lead (Bulk)
J : φ6.3x10, 2.5mm pitch taping
JT: φ6.3x7, 2.5mm pitch taping
K : φ8, 3.5mm pitch taping
P : φ6.3&φ8, 5.0mm pitch taping
PH: φ10, 5.0mm pitch taping

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

R7 series

Ultra Low ESR

Lead-free

RoHS Compliance

ESR 7mΩ

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

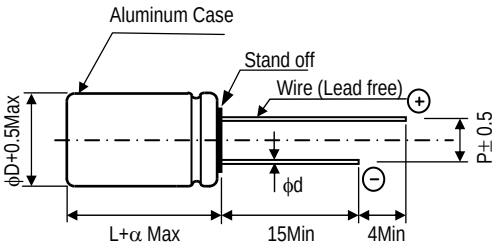
Items		Characteristics
		R7
Operating Temp. Range		- 55 to + 105°C
Rated Voltage Range		2.5 to 16V·DC
Capacitance Range		68 to 1500μF
Capacitance Tolerance		± 20% (M)
Endurance	Condition	105°C 2000Hrs at rated voltage
	Capacitance	Within ± 20% of the value before test
	Leakage Current	Not to exceed the value specified
	tan δ	Not to exceed 150% of the value specified
Failure Rate		0.1% / 1000Hrs. Max (60%CL)

●Size List

[φD×L]

R.V (S.V.) [V] / Cap. [μF]	2.5 (2.8)	4.0 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)
68					8×11.5
100				8×11.5	8×11.5
150			8×11.5		10×12.5
220			8×11.5	10×12.5	
270					10×12.5
330			10×12.5		10×12.5
390			8×11.5		
470				10×12.5	
560		8×11.5			
680	8×11.5		10×12.5	10×12.5	
820	8×11.5	10×12.5	10×12.5		
1000			10×12.5		
1200		10×12.5			
1500	10×12.5				

●Dimensions



[Unit : mm]

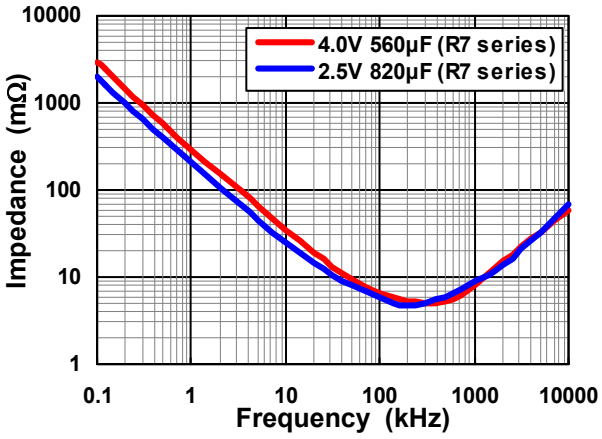
φD×L	φd	P	α
8×11.5	0.6	3.5	1.5
10×12.5	0.6	5.0	1.5

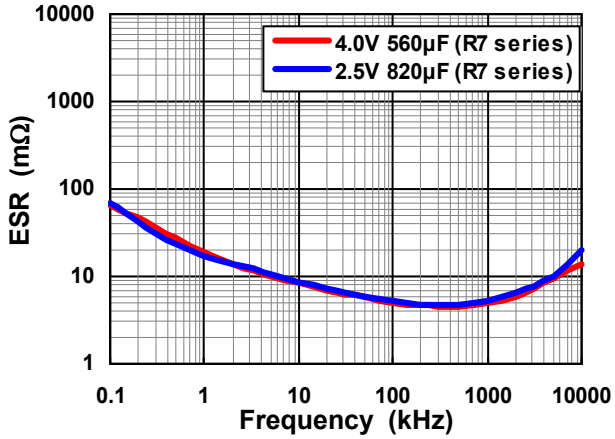
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number NICHICON	Part Number FPCAP	Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
2.5	680	RR70E681MDN1□□	FP-2R5RE681M-R7□□	425	0.08	7	5600	8 × 11.5
	820	RR70E821MDN1□□	FP-2R5RE821M-R7□□	513	0.08	7	5600	8 × 11.5
	1500	RR70E152MDN1□□	FP-2R5RE152M-R7□□	938	0.08	7	6100	10 × 12.5
4.0	560	RR70G561MDN1□□	FP-4R0RE561M-R7□□	224	0.08	7	5600	8 × 11.5
	820	RR70G821MDN1□□	FP-4R0RE821M-R7□□	328	0.08	7	6100	10 × 12.5
	1200	RR70G122MDN1□□	FP-4R0RE122M-R7□□	960	0.15	7	6100	10 × 12.5
6.3	150	RR70J151MDN1□□	FP-6R3RE151M-R7□□	47	0.07	7	5600	8 × 11.5
	220	RR70J221MDN1□□	FP-6R3RE221M-R7□□	69	0.07	7	5600	8 × 11.5
	330	RR70J331MDN1□□	FP-6R3RE331M-R7□□	104	0.07	7	6100	10 × 12.5
	390	RR70J391MDN1□□	FP-6R3RE391M-R7□□	246	0.08	7	5600	8 × 11.5
	680	RR70J681MDN1□□	FP-6R3RE681M-R7□□	428	0.08	7	6100	10 × 12.5
	820	RR70J821MDN1□□	FP-6R3RE821M-R7□□	517	0.12	7	6100	10 × 12.5
	1000	RR70J102MDN1□□	FP-6R3RE102M-R7□□	630	0.12	7	6100	10 × 12.5
10	100	RR71A101MDN1□□	FP-010RE101M-R7□□	50	0.07	7	5600	8 × 11.5
	220	RR71A221MDN1□□	FP-010RE221M-R7□□	110	0.07	7	6100	10 × 12.5
	470	RR71A471MDN1□□	FP-010RE471M-R7□□	470	0.08	7	6100	10 × 12.5
	680	RR71A681MDN1□□	FP-010RE681M-R7□□	1360	0.10	7	6100	10 × 12.5
16	68	RR71C680MDN1□□	FP-016RE680M-R7□□	54	0.06	7	5600	8 × 11.5
	100	RR71C101MDN1□□	FP-016RE101M-R7□□	80	0.06	7	5600	8 × 11.5
	150	RR71C151MDN1□□	FP-016RE151M-R7□□	120	0.06	7	6100	10 × 12.5
	270	RR71C271MDN1□□	FP-016RE271M-R7□□	648	0.08	7	6100	10 × 12.5
	330	RR71C331MDN1□□	FP-016RE331M-R7□□	792	0.08	7	6100	10 × 12.5

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Frequency Characteristics





●Part Number (EX) 4V, 560μF

Nichicon P/N

R	R7	0G	561	M	DN	1	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Lead Forming

CG: Cut lead (Bulk)
KX: φ8, 3.5mm pitch taping
PX: φ8, 5.0mm pitch taping
PH: φ10, 5.0mm pitch taping

FPCAP P/N

FP	—	4R0	RE	561	M	—	R7	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Lead Forming	Control code

R: Long lead (Bulk)
CG: Cut lead (Bulk)
K : φ8, 3.5mm pitch taping
P : φ8, 5.0mm pitch taping
PH: φ10, 5.0mm pitch taping

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

R5 series

Ultra Low ESR

Lead-free

RoHS Compliance

ESR 5mΩ

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

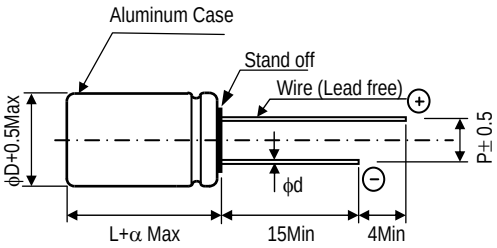
Items		Characteristics
		R5
Operating Temp. Range		- 55 to + 105°C
Rated Voltage Range		2.5 to 6.3V·DC
Capacitance Range		390 to 1500μF
Capacitance Tolerance		± 20% (M)
Endurance	Condition	105°C 2000Hrs at rated voltage
	Capacitance	Within ± 20% of the value before test
	Leakage Current	Not to exceed the value specified
	tan δ	Not to exceed 150% of the value specified
Failure Rate		0.1% / 1000Hrs. Max (60%CL)

●Size List

[φD×L]

Cap. [μF] \ R.V (S.V.) [V]	2.5 (2.8)	4.0 (4.6)	6.3 (7.2)
390			8×11.5
560	8×11.5	8×11.5	
680	8×11.5		10×12.5
820	8×11.5	10×12.5	10×12.5
1000	8×11.5		
1200		10×12.5	
1500	10×12.5		

●Dimensions



[Unit : mm]

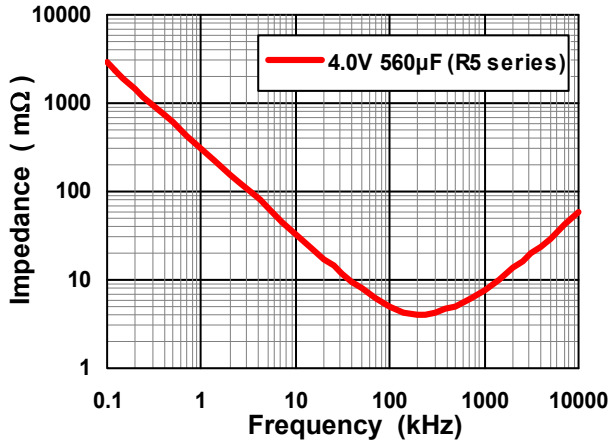
φD×L	φd	P	α
8×11.5	0.6	3.5	1.5
10×12.5	0.6	5.0	1.5

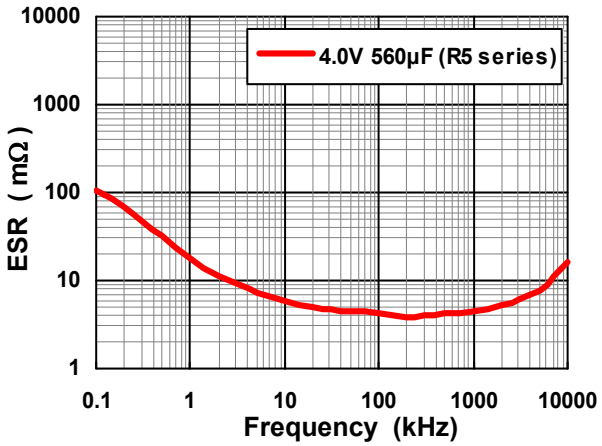
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number		Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
		NICHICON	FPCAP					
2.5	560	RR50E561MDN1□□	FP-2R5RE561M-R5□□	350	0.15	5	6630	8 × 11.5
	680	RR50E681MDN1□□	FP-2R5RE681M-R5□□	425	0.15	5	6630	8 × 11.5
	820	RR50E821MDN1□□	FP-2R5RE821M-R5□□	513	0.15	5	6630	8 × 11.5
	1000	RR50E102MDN1□□	FP-2R5RE102M-R5□□	625	0.15	5	6630	8 × 11.5
	1500	RR50E152MDN1□□	FP-2R5RE152M-R5□□	938	0.15	5	7220	10 × 12.5
4.0	560	RR50G561MDN1□□	FP-4R0RE561M-R5□□	560	0.15	5	6630	8 × 11.5
	820	RR50G821MDN1□□	FP-4R0RE821M-R5□□	820	0.15	5	7220	10 × 12.5
	1200	RR50G122MDN1□□	FP-4R0RE122M-R5□□	1200	0.15	5	7220	10 × 12.5
6.3	390	RR50J391MDN1□□	FP-6R3RE391M-R5□□	614	0.15	5	6630	8 × 11.5
	680	RR50J681MDN1□□	FP-6R3RE681M-R5□□	1071	0.15	5	7220	10 × 12.5
	820	RR50J821MDN1□□	FP-6R3RE821M-R5□□	1292	0.15	5	7220	10 × 12.5

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Frequency Characteristics





●Part Number (EX) 4V, 560μF

Nichicon P/N

R	R5	0G	561	M	DN	1	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Lead Forming

CG: Cut lead (Bulk)
KX: φ8, 3.5mm pitch taping
PX: φ8, 5.0mm pitch taping
PH: φ10, 5.0mm pitch taping

FPCAP P/N

FP	—	4R0	RE	561	M	—	R5	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Lead Forming	Control code

R: Long lead (Bulk)
CG: Cut lead (Bulk)
K : φ8, 3.5mm pitch taping
P : φ8, 5.0mm pitch taping
PH: φ10, 5.0mm pitch taping

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

L8 series

Ultra Low ESR | Large Capacitance | Endurance 2000/5000hrs | Low Profile | Lead-free | RoHS Compliance

UPGRADE

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

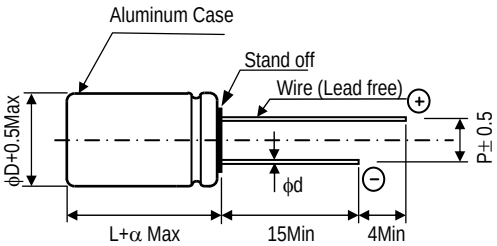
Items		Characteristics
		L8
Operating Temp. Range		- 55 to + 105°C
Rated Voltage Range		2.5 to 35V·DC
Capacitance Range		100 to 1500μF
Capacitance Tolerance		± 20% (M)
Endurance	Condition	105°C 2000/5000Hrs at rated voltage
	Capacitance	Within ± 20% of the value before test
	Leakage Current	Not to exceed the value specified
	tan δ	Not to exceed 150% of the value specified
Failure Rate		0.1% / 1000Hrs. Max (60%CL)

●Size List

[φD×L]

R.V (S.V.) [V] / Cap. [μF]	2.5 (2.8)	4.0 (4.6)	6.3 (7.2)	16 (18.4)	35 (40.2)
100				8×8	8×8
180				8×8	
220				8×8	
270				8×8	
330				8×8	
470			8×8		
560	8×8	8×8	8×8		
680			8×8		
820	8×8	8×8	8×8		
1000	8×8		8×8		
1200	8×8				
1500	8×8				

●Dimensions



[Unit : mm]

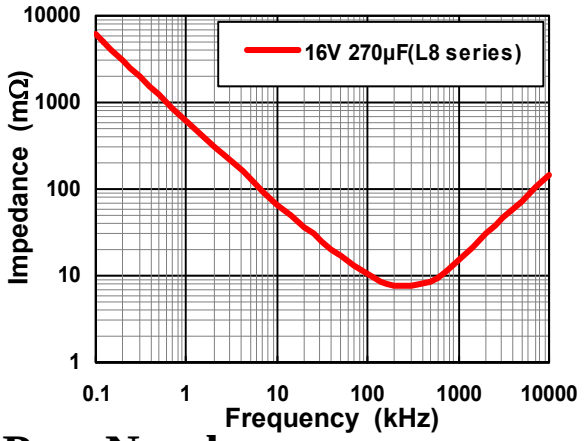
φD×L	φd	P	α
8×8	0.6	3.5	1.0

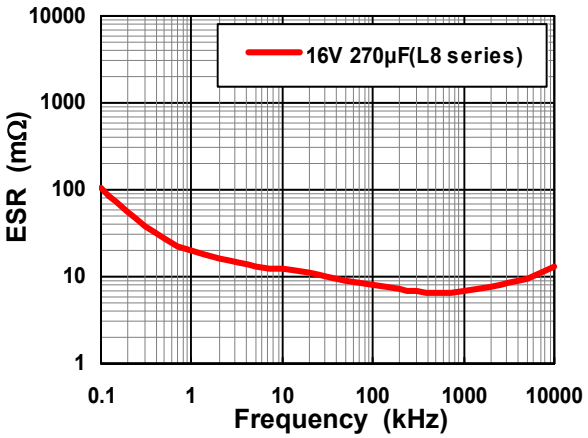
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number		Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
		NICHICON	FPCAP					
2.5	560	RL80E561MDN1□□	FP-2R5RE561M-L8□□	500	0.12	6	6100	8 × 8
	** 560	RL80E561MDNASQ□□	FP-2R5RE561M-L8□□-5K	500	0.12	6	6100	8 × 8
	820	RL80E821MDN1□□	FP-2R5RE821M-L8□□	513	0.12	6	6100	8 × 8
	** 820	RL80E821MDNASQ□□	FP-2R5RE821M-L8□□-5K	513	0.12	6	6100	8 × 8
	1000	RL80E102MDN1□□	FP-2R5RE102M-L8□□	625	0.12	6	6100	8 × 8
	1200	RL80E122MDN1□□	FP-2R5RE122M-L8□□	750	0.12	7	6100	8 × 8
	1500	RL80E152MDN1□□	FP-2R5RE152M-L8□□	938	0.12	7	6100	8 × 8
4.0	560	RL80G561MDN1□□	FP-4R0RE561M-L8□□	560	0.12	6	6100	8 × 8
	** 560	RL80G561MDNASQ□□	FP-4R0RE561M-L8□□-5K	560	0.12	6	6100	8 × 8
	820	RL80G821MDN1□□	FP-4R0RE821M-L8□□	820	0.12	6	6100	8 × 8
6.3	470	RL80J471MDN1□□	FP-6R3RE471M-L8□□	592	0.12	8	5700	8 × 8
	** 470	RL80J471MDNASQ□□	FP-6R3RE471M-L8□□-5K	592	0.12	8	5700	8 × 8
	560	RL80J561MDN1□□	FP-6R3RE561M-L8□□	706	0.12	8	5700	8 × 8
	** 560	RL80J561MDNASQ□□	FP-6R3RE561M-L8□□-5K	706	0.12	8	5700	8 × 8
	680	RL80J681MDN1□□	FP-6R3RE681M-L8□□	857	0.12	8	5700	8 × 8
	820	RL80J821MDN1□□	FP-6R3RE821M-L8□□	1033	0.12	8	5700	8 × 8
	1000	RL80J102MDN1□□	FP-6R3RE102M-L8□□	1260	0.12	9	5700	8 × 8
16	100	RL81C101MDN1□□	FP-016RE101M-L8□□	320	0.12	12	5000	8 × 8
	180	RL81C181MDN1□□	FP-016RE181M-L8□□	576	0.12	12	5000	8 × 8
	220	RL81C221MDN1□□	FP-016RE221M-L8□□	704	0.12	12	5000	8 × 8
	270	RL81C271MDN1□□	FP-016RE271M-L8□□	864	0.12	10	5000	8 × 8
	330	RL81C331MDN1□□	FP-016RE331M-L8□□	1056	0.12	12	5000	8 × 8
35	100	RL81V101MDN1□□	FP-035RE101M-L8□□	700	0.12	25	3000	8 × 8

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.
** Endurance 5000hrs product.

●Frequency Characteristics





●Part Number (EX) 6.3V, 560μF, 5000hrs (Endurance)

Nichicon P/N

R	L8	0J	561	M	DN	ASQ	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Lead Forming

ASQ : 5000hrs
1 : 2000hrs

CG: Cut lead (Bulk)
KX: φ8, 3.5mm pitch taping
PX: φ8, 5.0mm pitch taping

FPCAP P/N

FP	—	6R3	RE	561	M	—	L8	R	-5K
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Lead Forming	Control code

R: Long lead (Bulk)
CG: Cut lead (Bulk)
K : φ8, 3.5mm pitch taping
P : φ8, 5.0mm pitch taping

-5K : 5000hrs
Without -5K: 2000hrs

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

E5 series

Ultra Low ESR | Low Profile | Large Capacitance | Lead-free | RoHS Compliance

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

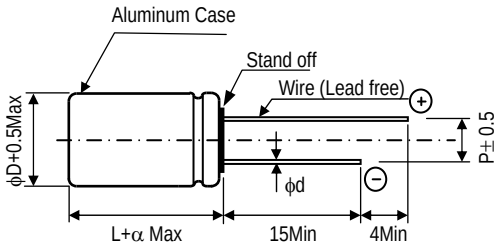
Items		Characteristics
		E5
Operating Temp. Range		- 55 to + 105°C
Rated Voltage Range		2.5 to 4.0V·DC
Capacitance Range		560 to 820μF
Capacitance Tolerance		± 20% (M)
Endurance	Condition	105°C 2000Hrs at rated voltage
	Capacitance	Within ± 20% of the value before test
	Leakage Current	Not to exceed the value specified
	tan δ	Not to exceed 150% of the value specified
Failure Rate		0.1% / 1000Hrs. Max (60%CL)

●Size List

[φD×L]

R.V (S.V.) [V] / Cap. [μF]	2.5 (2.8)	4.0 (4.6)
560	8×8	8×8
820	8×8	

●Dimensions



[Unit : mm]

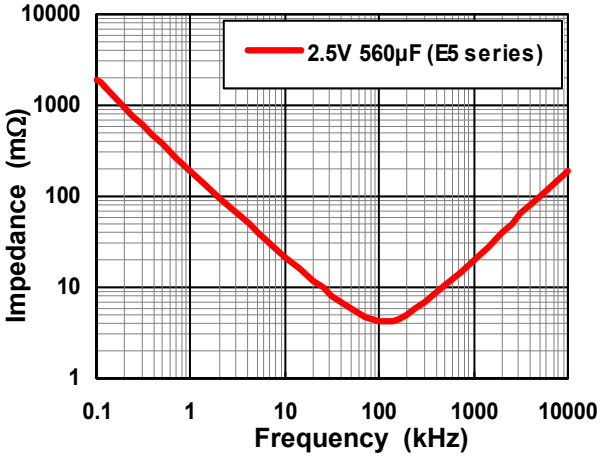
φD×L	φd	P	α
8×8	0.6	3.5	1.0

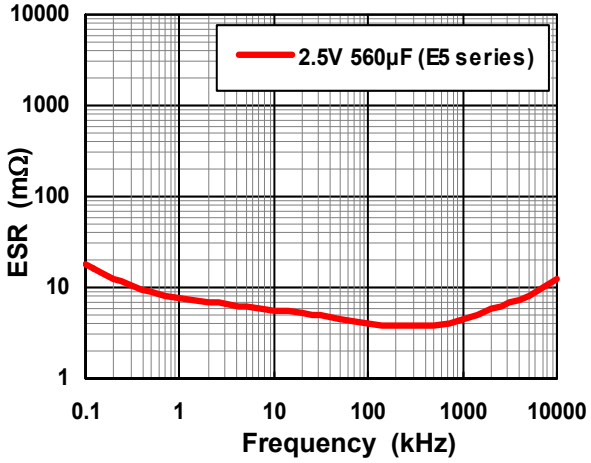
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number		Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
		NICHICON	FPCAP					
2.5	560	RE50E561MDN1□□	FP-2R5RE561M-E5□□	500	0.10	5	6300	8 × 8
	820	RE50E821MDN1□□	FP-2R5RE821M-E5□□	513	0.10	5	6300	8 × 8
4.0	560	RE50G561MDN1□□	FP-4R0RE561M-E5□□	560	0.10	5	6300	8 × 8

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Frequency Characteristics





●Part Number (EX) 4V, 560μF

Nichicon P/N

R	E5	0G	561	M	DN	1	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Lead Forming

CG: Cut lead (Bulk)
KX: φ8, 3.5mm pitch taping
PX: φ8, 5.0mm pitch taping

FPCAP P/N

FP	—	4R0	RE	561	M	—	E5	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Lead Forming	Control code

R: Long lead (Bulk)
CG: Cut lead (Bulk)
K : φ8, 3.5mm pitch taping
P : φ8, 5.0mm pitch taping

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

S8 series

Ultra Low ESR | Large Capacitance | Endurance 2000/5000hrs

Low ESL | Lead-free | RoHS Compliance

UPGRADE

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR and **Low ESL** at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

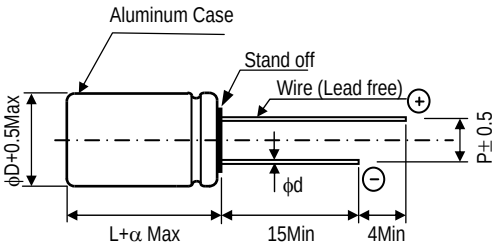
Items		Characteristics
		S8
Operating Temp. Range		- 55 to + 105°C
Rated Voltage Range		2.5 to 16V·DC
Capacitance Range		100 to 1200μF
Capacitance Tolerance		± 20% (M)
Endurance	Condition	105°C 2000/5000Hrs at rated voltage
	Capacitance	Within ± 20% of the value before test
	Leakage Current	Not to exceed the value specified
	tan δ	Not to exceed 150% of the value specified
Failure Rate		0.1% / 1000Hrs. Max (60%CL)

●Size List

[φD×L]

R.V (S.V.) [V] / Cap. [μF]	2.5 (2.8)	4.0 (4.6)	6.3 (7.2)	16 (18.4)
100				6.3×8
270				6.3×8
330	6.3×8		6.3×8	
470	6.3×8		6.3×8	
560	6.3×8	6.3×8	6.3×8	
820	6.3×8			
1200	6.3×8			

●Dimensions



[Unit : mm]

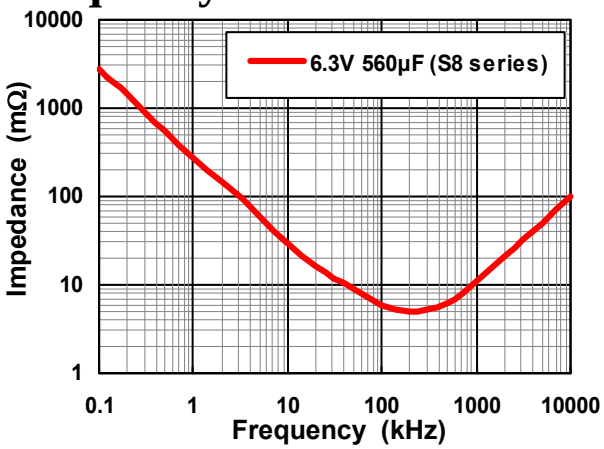
φD×L	φd	P	α
6.3×8	0.6	2.5	1.0

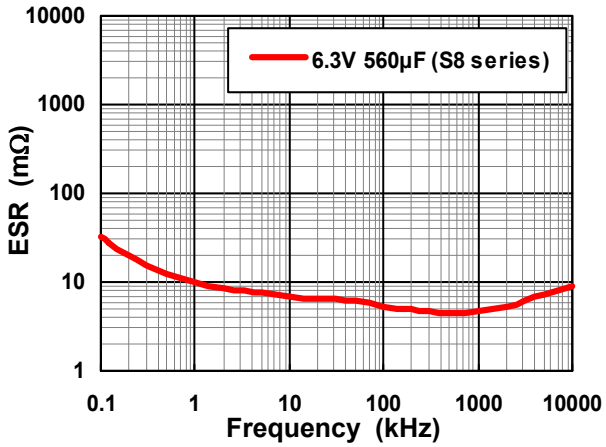
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number NICHICON	Part Number FPCAP	Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	ESL (Typ.) (nH, 10MHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
2.5	330	RS80E331MDN1□□	FP-2R5RE331M-S8□□	500	0.10	7	2	5600	6.3 × 8
	** 330	RS80E331MDNASQ□□	FP-2R5RE331M-S8□□-5K	500	0.10	7	2	5600	6.3 × 8
	470	RS80E471MDN1□□	FP-2R5RE471M-S8□□	500	0.10	7	2	5600	6.3 × 8
	** 470	RS80E471MDNASQ□□	FP-2R5RE471M-S8□□-5K	500	0.10	7	2	5600	6.3 × 8
	560	RS80E561MDN1□□	FP-2R5RE561M-S8□□	500	0.10	7	2	5600	6.3 × 8
	** 560	RS80E561MDNASQ□□	FP-2R5RE561M-S8□□-5K	500	0.10	7	2	5600	6.3 × 8
	820	RS80E821MDN1□□	FP-2R5RE821M-S8□□	512	0.10	7	2	5600	6.3 × 8
	** 820	RS80E821MDNASQ□□	FP-2R5RE821M-S8□□-5K	512	0.10	7	2	5600	6.3 × 8
	1200	RS80E122MDN1□□	FP-2R5RE122M-S8□□	750	0.10	7	2	5600	6.3 × 8
4.0	560	RS80G561MDN1□□	FP-4R0RE561M-S8□□	560	0.10	7	2	5000	6.3 × 8
	** 560	RS80G561MDNASQ□□	FP-4R0RE561M-S8□□-5K	560	0.10	7	2	5000	6.3 × 8
6.3	330	RS80J331MDN1□□	FP-6R3RE331M-S8□□	519	0.10	8	2	5000	6.3 × 8
	** 330	RS80J331MDNASQ□□	FP-6R3RE331M-S8□□-5K	519	0.10	8	2	5000	6.3 × 8
	470	RS80J471MDN1□□	FP-6R3RE471M-S8□□	740	0.10	8	2	5000	6.3 × 8
	** 470	RS80J471MDNASQ□□	FP-6R3RE471M-S8□□-5K	740	0.10	8	2	5000	6.3 × 8
	560	RS80J561MDN1□□	FP-6R3RE561M-S8□□	882	0.10	8	2	5000	6.3 × 8
	** 560	RS80J561MDNASQ□□	FP-6R3RE561M-S8□□-5K	882	0.10	8	2	5000	6.3 × 8
16	100	RS81C101MDN1□□	FP-016RE101M-S8□□	500	0.10	14	2	3800	6.3 × 8
	270	RS81C271MDN1□□	FP-016RE271M-S8□□	1296	0.10	15	2	3800	6.3 × 8

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.
** Endurance 5000hrs product.

●Frequency Characteristics





●Part Number (EX) 2.5V, 820μF, 5000hrs (Endurance)

Nichicon P/N

R	S8	0E	821	M	DN	ASQ	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Lead Forming

ASQ : 5000hrs
1 : 2000hrs

CG: Cut lead (Bulk)
JT: φ6.3, 2.5mm pitch taping
PX: φ6.3x8, 5.0mm pitch taping

FPCAP P/N

FP	—	2R5	RE	821	M	—	S8	R	-5K
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Lead Forming	Control code

R: Long lead (Bulk)
CG: Cut lead (Bulk)
JT: φ6.3x8, 2.5mm pitch taping
P : φ6.3x8, 5.0mm pitch taping

-5K : 5000hrs
Without -5K: 2000hrs

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

F8 series

Ultra Low ESR | Large Capacitance | Low ESL | Lead-free | RoHS Compliance

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR and **Low ESL** at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

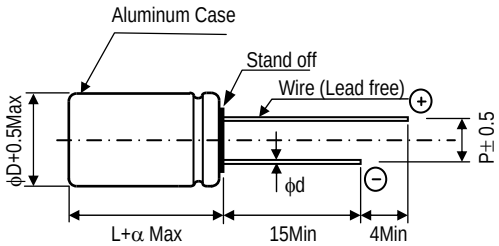
Items		Characteristics
		F8
Operating Temp. Range		- 55 to + 105°C
Rated Voltage Range		2.5 to 6.3V·DC
Capacitance Range		100 to 560μF
Capacitance Tolerance		± 20% (M)
Endurance	Condition	105°C 2000Hrs at rated voltage
	Capacitance	Within ± 20% of the value before test
	Leakage Current	Not to exceed the value specified
	tan δ	Not to exceed 150% of the value specified
Failure Rate		0.1% / 1000Hrs. Max (60%CL)

●Size List

[φD×L]

R.V (S.V.) [V] / Cap. [μF]	2.5 (2.8)	4.0 (4.6)	6.3 (7.2)
100	5×8		
270			5×8
330	5×8	5×8	
470	5×8		
560	5×8		

●Dimensions



[Unit : mm]

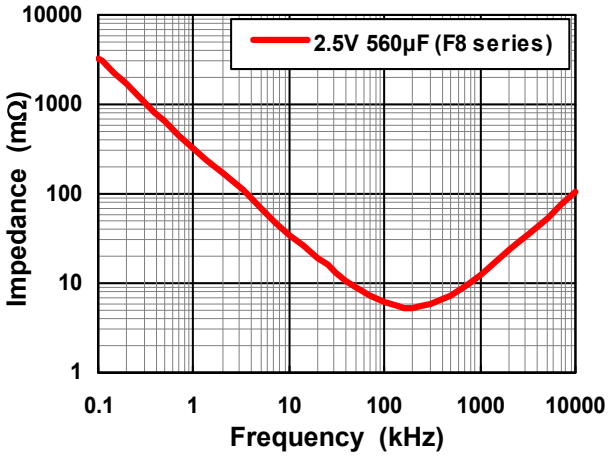
φD×L	φd	P	α
5×8	0.6	2.0	1.0

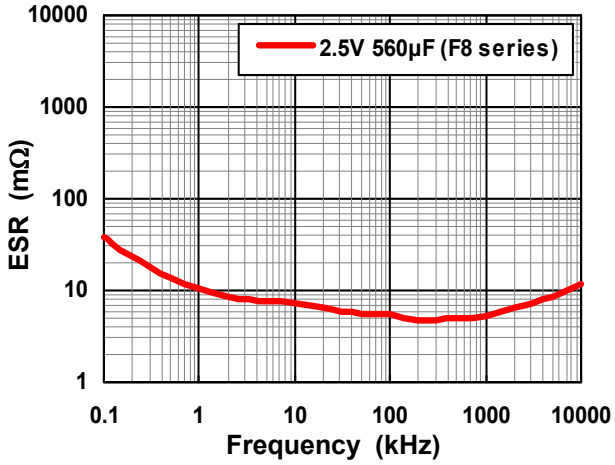
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number		Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	ESL (Typ.) (nH, 10MHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
		NICHICON	FPCAP						
2.5	100	RF80E101MDN1□□	FP-2R5RE101M-F8□□	500	0.10	7	1.5	4200	5 × 8
	330	RF80E331MDN1□□	FP-2R5RE331M-F8□□	500	0.10	7	1.5	4200	5 × 8
	470	RF80E471MDN1□□	FP-2R5RE471M-F8□□	500	0.10	7	1.5	4200	5 × 8
	560	RF80E561MDN1□□	FP-2R5RE561M-F8□□	500	0.10	7	1.5	4200	5 × 8
4	330	RF80G331MDN1□□	FP-4R0RE331M-F8□□	500	0.10	8	1.5	4000	5 × 8
6.3	270	RF80J271MDN1□□	FP-6R3RE271M-F8□□	500	0.10	11	1.5	3700	5 × 8

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Frequency Characteristics





●Part Number (EX) 2.5V, 560μF

Nichicon P/N

R	F8	0E	561	M	DN	1	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Lead Forming

CG: Cut lead (Bulk)
JT: φ5x8, 2.5mm pitch taping
PX:φ5x8, 5.0mm pitch taping

FPCAP P/N

FP	—	2R5	RE	561	M	—	F8	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Lead Forming	Control code

R: Long lead (Bulk)
CG: Cut lead (Bulk)
JT: φ5x8, 2.5mm pitch taping
P : φ5x8, 5.0mm pitch taping

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

NU series

Ultra Low ESR | Large Capacitance | Endurance 2000/5000hrs | High Voltage | Lead-free | RoHS Compliance

UPGRADE

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

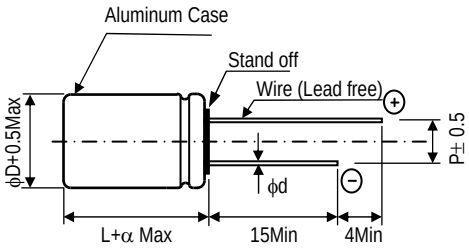
Items		Characteristics
		NU
Operating Temp. Range		- 55 to + 105°C
Rated Voltage Range		2.5 to 63V·DC
Capacitance Range		10 to 2700μF
Capacitance Tolerance		± 20% (M)
Endurance	Condition	105°C 2000/5000Hrs at rated voltage
	Capacitance	Within ± 20% of the value before test
	Leakage Current	Not to exceed the value specified
	tan δ	Not to exceed 150% of the value specified
Failure Rate		0.1% / 1000Hrs. Max (60%CL)

●Size List

[φD×L]

Cap. [μF] \ R.V (S.V.) [V]	2.5 (2.8)	4.0 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)	25 (28.7)	35 (40.2)	50 (57.5)	63 (72.5)
10				4×5					
33						8×11.5			8×11.5
39								8×11.5	10×12.5
47						8×11.5		10×12.5	
56									10×12.5
68						8×11.5		10×12.5	
100					6.3×10				
150							10×12.5		
180					8×11.5	8×11.5			
220			6.3×10						
270					8×11.5				
330					8×11.5	10×12.5			
470			8×11.5		10×12.5				
680			8×11.5		10×12.5				
820		8×11.5	8×11.5						
1000		8×11.5	8×11.5						
1200		8×11.5	8×11.5	10×12.5					
1500	8×11.5		10×12.5						
1800		10×12.5							
2200		10×12.5							
2700	10×12.5								

●Dimensions



[Unit : mm]

φD×L	φd	P	α
4×5	0.45	1.5	1.0
6.3×10	0.5	2.5	1.0
8×11.5	0.6	3.5	1.5
10×12.5	0.6	5.0	1.5

●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number NICHICON	Part Number FPCAP	Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
2.5	1500	RNU0E152MDN1□□	FP-2R5RE152M-NU□□	938	0.08	7	5700	8 x 11.5
	2700	RNU0E272MDN1□□	FP-2R5RE272M-NU□□	1350	0.08	7	6100	10 x 12.5
4.0	820	RNU0G821MDN1□□	FP-4R0RE821M-NU□□	656	0.08	7	5700	8 x 11.5
	1000	RNU0G102MDN1□□	FP-4R0RE102M-NU□□	800	0.08	7	5700	8 x 11.5
	1200	RNU0G122MDN1□□	FP-4R0RE122M-NU□□	960	0.08	7	5700	8 x 11.5
	1800	RNU0G182MDN1□□	FP-4R0RE182M-NU□□	1440	0.08	7	6100	10 x 12.5
	2200	RNU0G222MDN1□□	FP-4R0RE222M-NU□□	1760	0.08	7	6100	10 x 12.5
6.3	220	RNU0J221MDS1□□	FP-6R3RE221M-NU□□	277	0.08	20	3200	6.3 × 10
	470	RNU0J471MDN1□□	FP-6R3RE471M-NU□□	592	0.08	7	5700	8 × 11.5
	680	RNU0J681MDN1□□	FP-6R3RE681M-NU□□	857	0.08	7	5700	8 x 11.5
	820	RNU0J821MDN1□□	FP-6R3RE821M-NU□□	1033	0.08	7	5700	8 x 11.5
	1000	RNU0J102MDN1□□	FP-6R3RE102M-NU□□	1260	0.08	7	5700	8 x 11.5
	1200	RNU0J122MDN1□□	FP-6R3RE122M-NU□□	1512	0.08	9	6100	8 x 11.5
	1500	RNU0J152MDN1□□	FP-6R3RE152M-NU□□	1890	0.08	7	6100	10 x 12.5
10	10	RNU1A100MDS1□□	FP-010RE100M-NU□□	300	0.12	220	700	4 × 5
	** 10	RNU1A100MDSASQ□□	FP-010RE100M-NU□□-5K	300	0.12	220	700	4 × 5
	1200	RNU1A122MDN1□□	FP-010RE122M-NU□□	2400	0.08	9	6200	10 × 12.5
16	100	RNU1C101MDS1□□	FP-016RE101M-NU□□	320	0.08	25	2820	6.3 x 10
	** 100	RNU1C101MDSASQ□□	FP-016RE101M-NU□□-5K	320	0.08	25	2820	6.3 x 10
	180	RNU1C181MDN1□□	FP-016RE181M-NU□□	576	0.08	8	5700	8 × 11.5
	270	RNU1C271MDN1□□	FP-016RE271M-NU□□	864	0.08	8	5000	8 × 11.5
	** 270	RNU1C271MDNASQ□□	FP-016RE271M-NU□□-5K	864	0.08	8	5000	8 × 11.5
	330	RNU1C331MDN1□□	FP-016RE331M-NU□□	1056	0.08	8	6100	8 × 11.5
	470	RNU1C471MDN1□□	FP-016RE471M-NU□□	1504	0.08	10	6100	10 × 12.5
	680	RNU1C681MDN1□□	FP-016RE681M-NU□□	2176	0.08	10	6100	10 × 12.5
25	33	RNU1E330MDN1□□	FP-025RE330M-NU□□	413	0.12	24	3600	8 × 11.5
	47	RNU1E470MDN1□□	FP-025RE470M-NU□□	588	0.12	24	3600	8 × 11.5
	68	RNU1E680MDN1□□	FP-025RE680M-NU□□	850	0.12	24	3600	8 × 11.5
	180	RNU1E181MDN1□□	FP-025RE181M-NU□□	900	0.12	16	4650	8 × 11.5
	330	RNU1E331MDN1□□	FP-025RE331M-NU□□	1650	0.12	14	5000	10 × 12.5
35	150	RNU1V151MDN1□□	FP-035RE151M-NU□□	1050	0.12	20	3800	10 × 12.5
50	39	RNU1H390MDN1□□	FP-050RE390M-NU□□	390	0.12	25	2400	8 x 11.5
	47	RNU1H470MDN1□□	FP-050RE470M-NU□□	470	0.12	24	2700	10 x 12.5
	68	RNU1H680MDN1□□	FP-050RE680M-NU□□	680	0.12	24	2700	10 x 12.5
63	33	RNU1J330MDN1□□	FP-063RE330M-NU□□	416	0.12	26	2300	8 x 11.5
	39	RNU1J390MDN1□□	FP-063RE390M-NU□□	492	0.12	25	2600	10 x 12.5
	56	RNU1J560MDN1□□	FP-063RE560M-NU□□	706	0.12	25	2600	10 x 12.5

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.
** Endurance 5000hrs product.

●Part Number (EX) 16V, 270μF, 5000hrs (Endurance)

Nichicon P/N

R	NU	1C	271	M	DN	ASQ	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Lead Forming

ASQ : 5000hrs
1 : 2000hrs

CG: Cut lead (Bulk) , JX: φ6.3x10 2.5mm pitch taping
KX: φ8, 3.5mm pitch taping, PX: φ6.3&φ8, 5.0mm pitch taping
PH: φ10, 5.0mm pitch taping

FPCAP P/N

FP	—	016	RE	271	M	—	NU	R	-5K
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Lead Forming	Control code

R: Long lead (Bulk) , CG: Cut lead (Bulk)
J : φ6.3x10, 2.5mm pitch taping , K : φ8, 3.5mm pitch taping
P : φ6.3&φ8, 5.0mm pitch taping ,PH: φ10, 5.0mm pitch taping

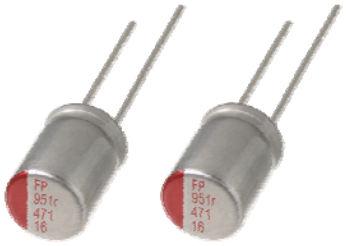
-5K : 5000hrs
Without -5K: 2000hrs

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

NE series

Ultra Low ESR | Ultra Large Capacitance | Lead free | RoHS Compliance

UPGRADE



●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

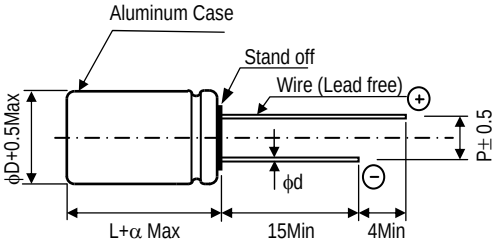
Items		Characteristics
		NE
Operating Temp. Range		-55 to +105°C
Rated Voltage Range		2.5 to 16V·DC
Capacitance Range		100 to 1200μF
Capacitance Tolerance		± 20% (M)
Endurance	Condition	105°C 2000Hrs at rated voltage
	Capacitance	Within ± 20% of the value before test
	Leakage Current	Not to exceed the value specified
	tan δ	Not to exceed 150% of the value specified
Failure Rate		0.1% / 1000Hrs. Max (60%CL)

●Size List

[φD×L]

R.V (S.V.) [V] / Cap. [μF]	2.5 (2.8)	6.3 (7.2)	10 (11.5)	16 (18.4)
100				5×10
220			6.3×10	
270		5×8		
470				8×11.5
680	8×6			
820				10×12.5
1200		8×9		

●Dimensions



[Unit : mm]

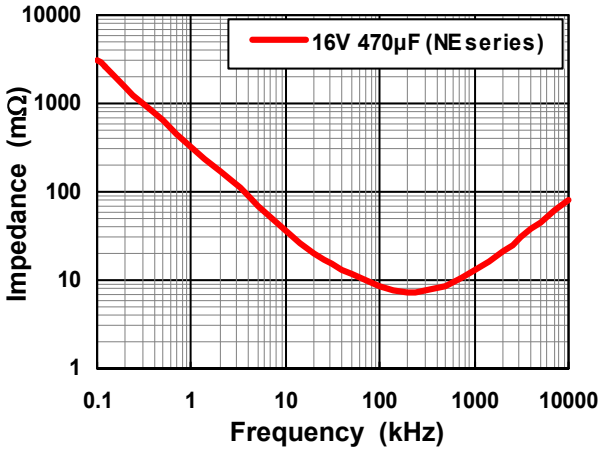
φD×L	φd	P	α
5×8	0.5	2.0	1.0
5×10	0.5	2.0	1.0
6.3×10	0.5	2.5	1.0
8×6	0.6	3.5	1.0
8×9	0.6	3.5	1.0
8×11.5	0.6	3.5	1.5
10×12.5	0.6	5.0	1.5

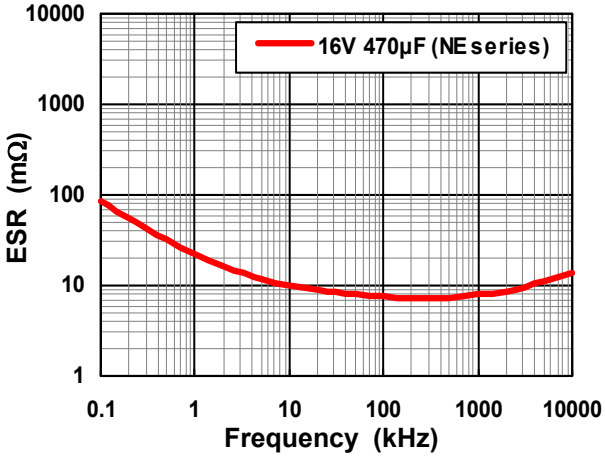
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number NICHICON	Part Number FPCAP	Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
2.5	680	RNE0E681MDN1□□	FP-2R5RE681M-NE□□	500	0.10	8	4900	8 × 6
6.3	270	RNE0J271MDS1□□	FP-6R3RE271M-NE□□	500	0.10	12	3600	5 × 8
	1200	RNE0J122MDN1□□	FP-6R3RE122M-NE□□	1512	0.08	10	5700	8 × 9
10	220	RNE1A221MDS1□□	FP-010RE221M-NE□□	440	0.08	30	2500	6.3 × 10
16	100	RNE1C101MDS1□□	FP-016RE101M-NE□□	320	0.08	35	2300	5 × 10
	470	RNE1C471MDN1□□	FP-016RE471M-NE□□	1504	0.08	10	5400	8 × 11.5
	820	RNE1C821MDN1□□	FP-016RE821M-NE□□	2624	0.08	11	5600	10 × 12.5

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Frequency Characteristics





●Part Number (EX) 16V, 470μF

Nichicon P/N

R	NE	1C	471	M	DN	1	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Lead Forming

CG: Cut lead (Bulk)
JT: φ5x8, 2.5mm pitch taping
JX: φ5x10, φ6.3x10, 2.5mm pitch taping
KX: φ8, 3.5mm pitch taping
PX: φ5&φ6.3&φ8, 5.0mm pitch taping
PH: φ10, 5.0mm pitch taping

FPCAP P/N

FP	—	016	RE	471	M	—	NE	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Lead Forming	Control code

R: Long lead (Bulk)
CG: Cut lead (Bulk)
JT: φ5x8, 2.5mm pitch taping
J : φ5x10, φ6.3x10, 2.5mm pitch taping
K : φ8, 3.5mm pitch taping
P : φ5&φ6.3&φ8, 5.0mm pitch taping
PH: φ10, 5.0mm pitch taping

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

S6 series

Low ESR | Low Profile | Large Capacitance | Lead-free | RoHS Compliance

NEW

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

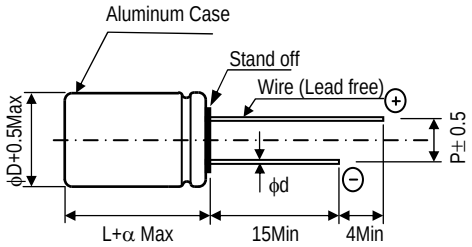
Items		Characteristics
		S6
Operating Temp. Range		-55 to +105°C
Rated Voltage Range		2.5 to 25 V·DC
Capacitance Range		33 to 560 μF
Capacitance Tolerance		±20% (M)
Endurance	Condition	105°C 2000Hrs at rated voltage
	Capacitance	Within ±20% of the value before test
	Leakage Current	Not to exceed the value specified
	tan δ	Not to exceed 150% of the value specified
Failure Rate		0.1% / 1000Hrs. Max (60%CL)

●Size List

[φD×L]

R.V (S.V.) [V] / Cap. [μF]	2.5 (2.8)	10 (11.5)	16 (18.4)	25 (28.7)
33				6.3×5
100			6.3×6	
150		6.3×5		
560	6.3×5			

●Dimensions



[Unit : mm]

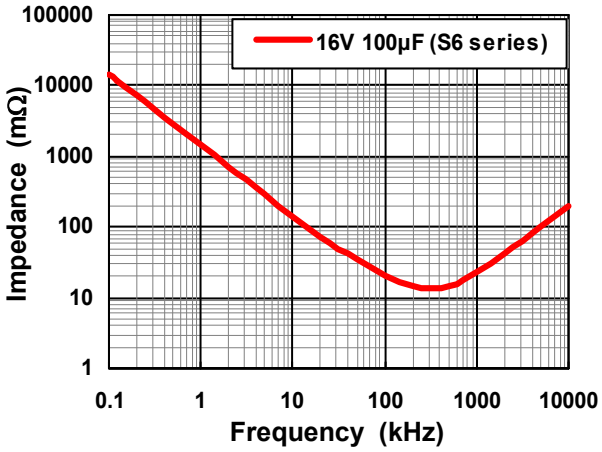
φD×L	φd	P	α
6.3×5	0.5	2.5	1.0
6.3×6	0.45	2.5	1.0

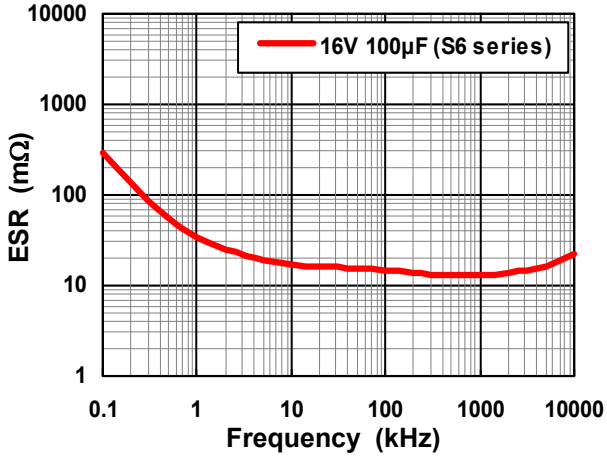
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number NICHICON	Part Number FPCAP	Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
2.5	560	RS60E561MCN1□□	FP-2R5RE561M-S6□□	700	0.12	13	3600	6.3 × 5
10	150	RS61A151MCN1□□	FP-010RE151M-S6□□	450	0.10	25	2500	6.3 × 5
16	100	RS61C101MDS1□□	FP-016RE101M-S6□□	500	0.10	24	2490	6.3 × 6
25	33	RS61E330MCN1□□	FP-025RE330M-S6□□	165	0.10	60	1700	6.3 × 5

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Frequency Characteristics





●Part Number (EX) 16V, 100μF

Nichicon P/N

R	S6	1C	101	M	DS	1	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Lead Forming

CG: Cut lead (Bulk)
JT : φ6.3x5/6, 2.5mm pitch taping
PX : φ6.3 5.0mm pitch taping

FPCAP P/N

FP	—	016	RE	101	M	—	S6	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Lead Forming	Control code

R: Long lead (Bulk)
CG: Cut lead (Bulk)
JT: φ6.3x5/6, 2.5mm pitch taping
P : φ6.3, 5.0mm pitch taping

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

HT series

Low ESR | Guarantee 125ºC | Large Capacitance | Lead-free | RoHS Compliance

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Guaranteed at 125 degrees and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

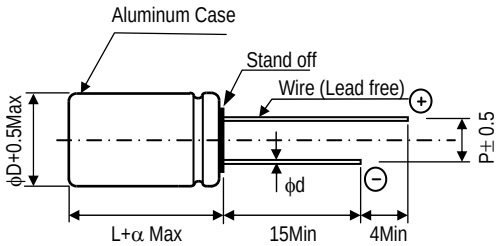
Items		Characteristics
		HT
Operating Temp. Range		- 55 to + 125°C
Rated Voltage Range		6.3 to 20V·DC
Capacitance Range		150 to 820μF
Capacitance Tolerance		± 20% (M)
Endurance	Condition	125°C 1000Hrs at rated voltage
	Capacitance	Within ± 20% of the value before test
	Leakage Current	Not to exceed the value specified
	tan δ	Not to exceed 150% of the value specified
Failure Rate		0.5% / 1000Hrs. Max (60%CL)

●Size List

[φD×L]

R.V (S.V.) [V] / Cap. [μF]	6.3 (7.2)	10 (11.5)	16 (18.4)	20 (23)
150				10×12.5
220		8×11.5		
330		8×11.5	10×12.5	
560		10×12.5		
680	10×12.5			
820	10×12.5			

●Dimensions



[Unit : mm]

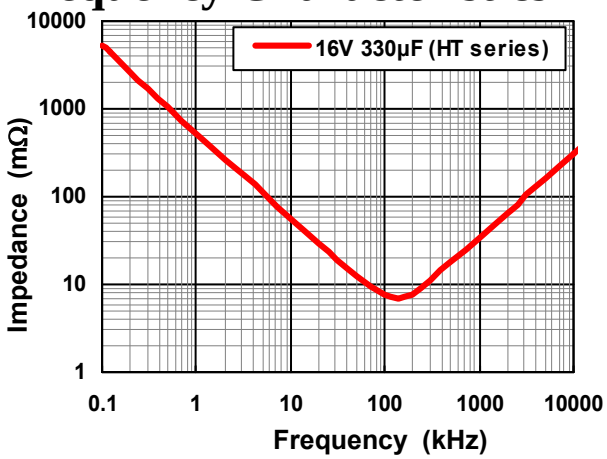
φD×L	φd	P	α
8×11.5	0.6	3.5	1.5
10×12.5	0.6	5.0	1.5

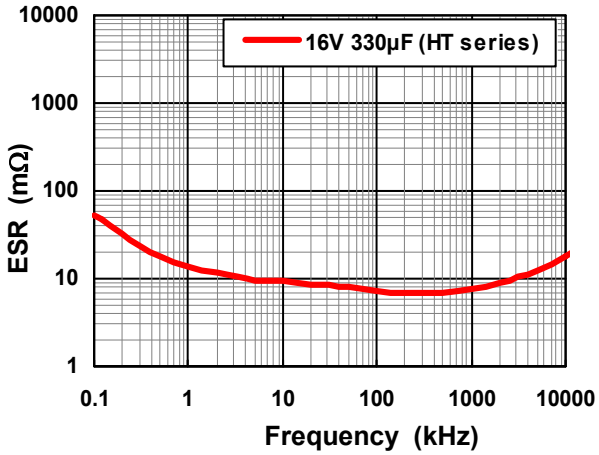
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number NICHICON	Part Number FPCAP	Leakage Current *1 (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current *2 105℃ or less	Rated Ripple Current *2 105℃ to 125℃	Case Size φD×L(mm)
6.3	680	RHT0J681MDN1□□	FP-6R3RE681M-HT□□	857	0.12	12	5450	1740	10 x 12.5
	820	RHT0J821MDN1□□	FP-6R3RE821M-HT□□	1033	0.12	12	5450	1740	10 × 12.5
10	220	RHT1A221MDN1□□	FP-010RE221M-HT□□	440	0.12	17	3950	1260	8 × 11.5
	330	RHT1A331MDN1□□	FP-010RE331M-HT□□	660	0.12	17	3950	1260	8 × 11.5
	560	RHT1A561MDN1□□	FP-010RE561M-HT□□	1120	0.12	13	5250	1680	10 × 12.5
16	330	RHT1C331MDN1□□	FP-016RE331M-HT□□	1056	0.12	16	4750	1520	10 × 12.5
20	150	RHT1D151MDN1□□	FP-020RE151M-HT□□	600	0.12	20	4350	1390	10 × 12.5

***1**: In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.
***2**: At ambient temperature

●Frequency Characteristics





●Part Number (EX) 16V, 330μF

Nichicon P/N

R	HT	1C	331	M	DN	1	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Lead Forming

CG: Cut lead (Bulk)
KX: φ8, 3.5mm pitch taping
PX: φ8, 5.0mm pitch taping
PH: φ10, 5.0mm pitch taping

FPCAP P/N

FP	—	016	RE	331	M	—	HT	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Lead Forming	Control code

R: Long lead (Bulk)
CG: Cut lead (Bulk)
K : φ8, 3.5mm pitch taping
P : φ8, 5.0mm pitch taping
PH: φ10, 5.0mm pitch taping

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

PS & PA series

Low ESR | High Voltage | SMD | Lead-free | RoHS Compliance

UPGRADE

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

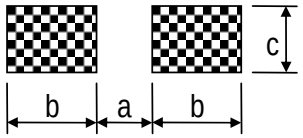
●Specifications

Items		Characteristic
		PS, PA
Operating temp. range		-55 to +105°C
Rated voltage range		2.5 to 63V·DC
Capacitance range		8.2 to 1500μF
Capacitance tolerance		±20% (M)
Endurance	Test condition	105°C, rated voltage 2000Hrs.
	Capacitance	Within ±20% of initial value before test
	Leakage current	Not to exceed the initial specified value
	ESR	Not to exceed 150% of initial specified value
	tan δ	Not to exceed 150% of initial specified value
Failure Rate		0.5% / 1000Hrs. Max (60%CL)

●Size List ( ) : PA series [φD×L]

R.V. (S.V.) [V] / Cap. [μF]	2.5 (2.8)	4.0 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)	25 (28.7)	50 (57.5)	63 (72.5)
8.2								6.3×5.7
12							6.3×5.7	8×6.7
22						8×6.7	8×6.7	10×7.7
33							10×7.7	8×11.7
39					6.3×5.7 (6.3×5.7)			
47				6.3×5.7			8×11.7	
56				6.3×5.7	8×6.7			10×12.4
82			6.3×5.7		8×6.7		10×12.4	
100		6.3×5.7			10×7.7			
120				8×6.7				
150			8×6.7		10×7.7			
180			8×6.7		8×11.7			
220		8×6.7			8×11.7 (10×7.7)			
270				10×7.7	8×11.7			
330		8×6.7	10×7.7	8×11.7 (10×7.7)	10×12.4			
470		10×7.7	8×11.7					
560		8×11.7 (8×11.7)	8×11.7	10×12.4				
680	8×11.7		10×12.4					
820			10×12.4					
1000			10×12.4					
1200		10×12.4						
1500	10×12.4							

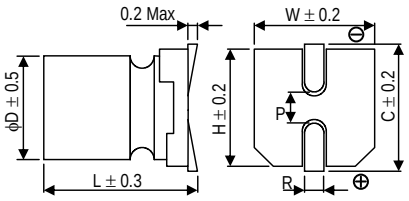
●Recommended land pattern



[Unit: mm]

φD	a	b	c
6.3	2.1	3.5	1.6
8	2.8	4.2	1.9
10	4.3	4.4	1.9

●Dimensions



[Unit: mm]

φD×L	W	H	C	R	P
6.3×5.7	6.5	6.5	7.2	0.5 to 0.9	2.1
8×6.7	8.3	8.3	9.0	0.8 to 1.1	3.2
8×11.7	8.3	8.3	9.0	0.8 to 1.1	3.2
10×7.7	10.3	10.3	11.0	0.8 to 1.1	4.6
10×12.4	10.3	10.3	11.0	0.8 to 1.1	4.6

●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number		Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
		NICHICON	FPCAP					
2.5	680	RPS0E681MCN1GS	FP-2R5ME681M-PSR	425	0.12	13	4500	8 × 11.7
	1500	RPS0E152MCN1GS	FP-2R5ME152M-PSR	938	0.12	10	5500	10 × 12.4
4.0	100	RPS0G101MCN1GS	FP-4R0ME101M-PSR	80	0.12	35	2200	6.3 × 5.7
	220	RPS0G221MCN1GS	FP-4R0ME221M-PSR	176	0.12	30	2700	8 × 6.7
	330	RPS0G331MCN1GS	FP-4R0ME331M-PSR	264	0.12	30	2700	8 × 6.7
	470	RPS0G471MCN1GS	FP-4R0ME471M-PSR	376	0.12	22	3800	10 × 7.7
	560	RPS0G561MCN1GS	FP-4R0ME561M-PSR	448	0.12	13	4500	8 × 11.7
	560	RPA0G561MCN1GS	FP-4R0ME561M-PAR	448	0.12	9	5400	8 × 11.7
	1200	RPS0G122MCN1GS	FP-4R0ME122M-PSR	960	0.12	12	5500	10 × 12.4
6.3	82	RPS0J820MCN1GS	FP-6R3ME820M-PSR	103	0.12	35	2200	6.3 × 5.7
	150	RPS0J151MCN1GS	FP-6R3ME151M-PSR	189	0.12	30	2600	8 × 6.7
	180	RPS0J181MCN1GS	FP-6R3ME181M-PSR	227	0.12	30	2600	8 × 6.7
	330	RPS0J331MCN1GS	FP-6R3ME331M-PSR	416	0.12	22	3600	10 × 7.7
	470	RPS0J471MCN1GS	FP-6R3ME471M-PSR	592	0.15	15	4300	8 × 11.7
	560	RPS0J561MCN1GS	FP-6R3ME561M-PSR	706	0.15	14	4400	8 × 11.7
	680	RPS0J681MCN1GS	FP-6R3ME681M-PSR	643	0.15	13	5200	10 × 12.4
	820	RPS0J821MCN1GS	FP-6R3ME821M-PSR	775	0.15	12	5500	10 × 12.4
	1000	RPS0J102MCN1GS	FP-6R3ME102M-PSR	945	0.15	12	5500	10 × 12.4
10	47	RPS1A470MCN1GS	FP-010ME470M-PSR	94	0.12	40	2100	6.3 × 5.7
	56	RPS1A560MCN1GS	FP-010ME560M-PSR	112	0.12	40	2100	6.3 × 5.7
	120	RPS1A121MCN1GS	FP-010ME121M-PSR	240	0.12	30	2600	8 × 6.7
	270	RPS1A271MCN1GS	FP-010ME271M-PSR	540	0.12	25	3500	10 × 7.7
	330	RPS1A331MCN1GS	FP-010ME331M-PSR	660	0.15	17	4000	8 × 11.7
	330	RPA1A331MCN1GS	FP-010ME331M-PAR	660	0.12	20	3600	10 × 7.7
	560	RPS1A561MCN1GS	FP-010ME561M-PSR	840	0.15	13	5300	10 × 12.4
16	39	RPS1C390MCN1GS	FP-016ME390M-PSR	125	0.10	45	2000	6.3 × 5.7
	39	RPA1C390MCN1GS	FP-016ME390M-PAR	125	0.10	24	2500	6.3 × 5.7
	56	RPS1C560MCN1GS	FP-016ME560M-PSR	179	0.10	40	2300	8 × 6.7
	82	RPS1C820MCN1GS	FP-016ME820M-PSR	262	0.10	40	2300	8 × 6.7
	100	RPS1C101MCN1GS	FP-016ME101M-PSR	320	0.10	30	3200	10 × 7.7
	150	RPS1C151MCN1GS	FP-016ME151M-PSR	480	0.10	30	3200	10 × 7.7
	180	RPS1C181MCN1GS	FP-016ME181M-PSR	576	0.12	20	3700	8 × 11.7
	220	RPS1C221MCN1GS	FP-016ME221M-PSR	704	0.12	20	3700	8 × 11.7
	220	RPA1C221MCN1GS	FP-016ME221M-PAR	704	0.10	22	3450	10 × 7.7
	270	RPS1C271MCN1GS	FP-016ME271M-PSR	864	0.12	14	4400	8 × 11.7
	330	RPS1C331MCN1GS	FP-016ME331M-PSR	792	0.12	16	4800	10 × 12.4
25	22	RPS1E220MCN1GS	FP-025ME220M-PSR	275	0.12	50	1800	8 × 6.7
50	12	RPS1H120MCN1GS	FP-050ME120M-PSR	120	0.12	40	1250	6.3 × 5.7
	22	RPS1H220MCN1GS	FP-050ME220M-PSR	220	0.12	37	1550	8 × 6.7
	33	RPS1H330MCN1GS	FP-050ME330M-PSR	330	0.12	32	1950	10 × 7.7
	47	RPS1H470MCN1GS	FP-050ME470M-PSR	470	0.15	26	2300	8 × 11.7
	82	RPS1H820MCN1GS	FP-050ME820M-PSR	820	0.15	23	2800	10 × 12.4
63	8.2	RPS1J8R2MCN1GS	FP-063ME8R2M-PSR	103	0.12	41	1200	6.3 × 5.7
	12	RPS1J120MCN1GS	FP-063ME120M-PSR	151	0.12	38	1500	8 × 6.7
	22	RPS1J220MCN1GS	FP-063ME220M-PSR	277	0.12	33	1900	10 × 7.7
	33	RPS1J330MCN1GS	FP-063ME330M-PSR	416	0.15	27	2250	8 × 11.7
	56	RPS1J560MCN1GS	FP-063ME560M-PSR	706	0.15	24	2700	10 × 12.4

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Part Number (EX) 4V, 1200μF, PS series

Nichicon P/N

R	PS	0G	122	M	CN	1	GS
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Taping code

FPCAP P/N

FP	—	4R0	ME	122	M	—	PS	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Taping code	Control code

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

HS & HA series

Large Capacitance | Low ESR | φ8 | SMD | Lead-free | RoHS Compliance

UPGRADE

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

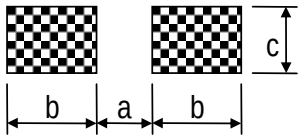
Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

Items		Characteristic
		HS, HA
Operating temp. range		-55 to +105°C
Rated voltage range		2.5 to 35V·DC
Capacitance range		100 to 1500μF
Capacitance tolerance		±20% (M)
Endurance	Test condition	105°C, rated voltage 2000Hrs.
	Capacitance	Within ±20% of initial value before test
	Leakage current	Not to exceed the initial specified value
	ESR	Not to exceed 150% of initial specified value
	tan δ	Not to exceed 150% of initial specified value
Failure Rate		0.5% / 1000Hrs. Max (60%CL)

●Recommended land pattern



[Unit: mm]

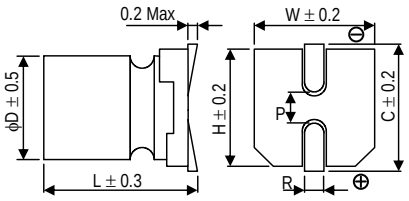
φD	a	b	c
8	2.8	4.2	1.9

●Size (ESR) List

[φD×L (mΩ)]

R.V. (S.V.) [V] / Cap. [μF]	2.5 (2.8)		4.0 (4.6)		6.3 (7.2)		10 (11.5)	16 (18.4)	25 (28.7)	35 (40.2)
	HS	HA	HS	HA	HS	HA	HS	HA	HS	HS
100									8x8.7 (25)	8x8.7 (25)
150							8x6.7 (25)	8x6.7 (22)		
330						8x6.7 (9)	8x7.7 (19)			
390					8x6.7 (18)	8x6.7 (9)				
470						8x6.7 (9)				
560			8x6.7 (16)	8x6.7 (8)		8x7.7 (9)				
680		8x6.7 (8)		8x7.7 (8)						
820	8x11.7 (9)	8x6.7 (8)			8x11.7 (10)					
1000		8x7.7 (8)			8x11.7 (10)					
1200			8x11.7 (9)							
1500	8x11.7 (9)		8x11.7 (12)							

●Dimensions



[Unit: mm]

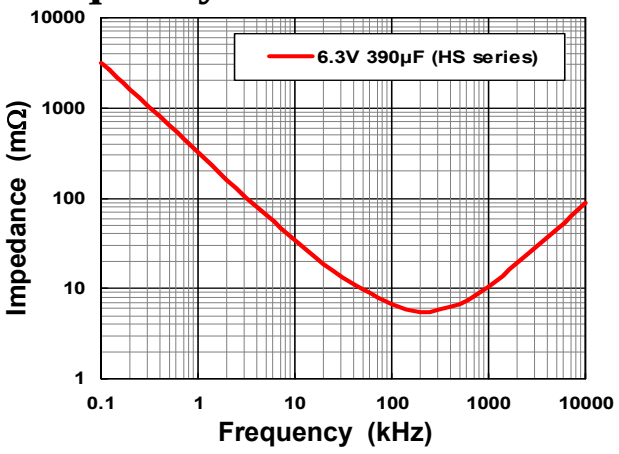
φD×L	W	H	C	R	P
8×6.7	8.3	8.3	9.0	0.8 to 1.1	3.2
8×7.7	8.3	8.3	9.0	0.8 to 1.1	3.2
8×8.7	8.3	8.3	9.0	0.8 to 1.1	3.2
8×11.7	8.3	8.3	9.0	0.8 to 1.1	3.2

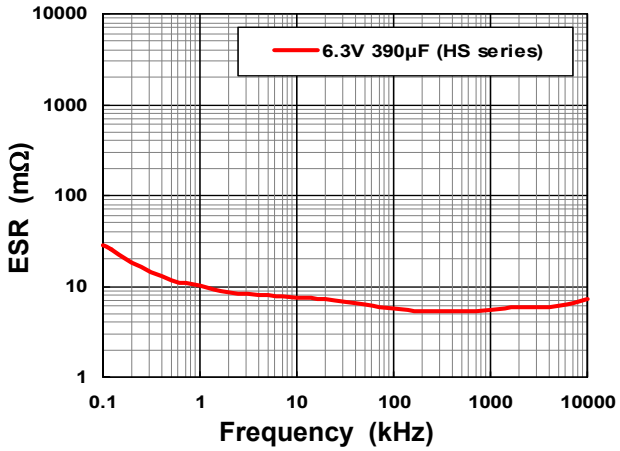
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number		Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
		NICHICON	FPCAP					
2.5	680	RHA0E681MCN1GS	FP-2R5ME681M-HAR	700	0.12	8	5000	8 × 6.7
	820	RHS0E821MCN1GS	FP-2R5ME821M-HSR	700	0.12	9	5400	8 × 11.7
	820	RHA0E821MCN1GS	FP-2R5ME821M-HAR	700	0.12	8	5000	8 × 6.7
	1000	RHA0E102MCN1GS	FP-2R5ME102M-HAR	750	0.12	8	5000	8 × 7.7
	1500	RHS0E152MCN1GS	FP-2R5ME152M-HSR	1125	0.12	9	5400	8 × 11.7
4.0	560	RHS0G561MCN1GS	FP-4R0ME561M-HSR	700	0.12	16	3200	8 × 6.7
	560	RHA0G561MCN1GS	FP-4R0ME561M-HAR	700	0.12	8	5000	8 × 6.7
	680	RHA0G681MCN1GS	FP-4R0ME681M-HAR	816	0.12	8	5000	8 × 7.7
	1200	RHS0G122MCN1GS	FP-4R0ME122M-HSR	1440	0.12	9	5400	8 × 11.7
	1500	RHS0G152MCN1GS	FP-4R0ME152M-HSR	1800	0.12	12	4700	8 × 11.7
6.3	330	RHA0J331MCN1GS	FP-6R3ME331M-HAR	700	0.12	9	4500	8 × 6.7
	390	RHS0J391MCN1GS	FP-6R3ME391M-HSR	737	0.12	18	3200	8 × 6.7
	390	RHA0J391MCN1GS	FP-6R3ME391M-HAR	737	0.12	9	4500	8 × 6.7
	470	RHA0J471MCN1GS	FP-6R3ME471M-HAR	888	0.12	9	4500	8 × 6.7
	560	RHA0J561MCN1GS	FP-6R3ME561M-HAR	1058	0.12	9	4500	8 × 7.7
	820	RHS0J821MCN1GS	FP-6R3ME821M-HSR	1550	0.12	10	5150	8 × 11.7
	1000	RHS0J102MCN1GS	FP-6R3ME102M-HSR	1890	0.12	10	5150	8 × 11.7
10	150	RHS1A151MCN1GS	FP-010ME151M-HSR	700	0.12	25	3000	8 × 6.7
	330	RHS1A331MCN1GS	FP-010ME331M-HSR	660	0.12	19	3390	8 × 7.7
16	150	RHA1C151MCN1GS	FP-016ME151M-HAR	700	0.12	22	3220	8 × 6.7
25	100	RHS1E101MCN1GS	FP-025ME101M-HSR	700	0.12	25	3000	8 × 8.7
35	100	RHS1V101MCN1GS	FP-035ME101M-HSR	700	0.12	25	3000	8 × 8.7

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Frequency Characteristics





●Part Number (EX) 6.3V, 390μF, HS series

Nichicon P/N

R	HS	0J	391	M	CN	1	GS
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Taping code

FPCAP P/N

FP	—	6R3	ME	391	M	—	HS	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Taping code	Control code

nichicon

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

SS & SA & SB series

Large Capacitance | Low ESR | φ6.3
SMD | Lead-free | RoHS Compliance

UPGRADE

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

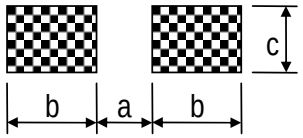
Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

Items		Characteristic
		SS, SA, SB
Operating temp. range		-55 to +105°C
Rated voltage range		2.5 to 25V·DC
Capacitance range		10 to 560μF
Capacitance tolerance		±20% (M)
Endurance	Test condition	105°C, rated voltage 2000Hrs.
	Capacitance	Within ±20% of initial value before test
	Leakage current	Not to exceed the initial specified value
	ESR	Not to exceed 150% of initial specified value
	tan δ	Not to exceed 150% of initial specified value
Failure Rate		0.5% / 1000Hrs. Max (60%CL)

●Recommended land pattern



[Unit: mm]

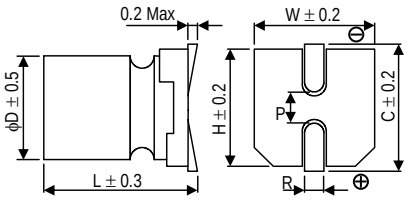
φD	a	b	c
6.3	2.1	3.5	1.6

●Size (ESR) List

[φD×L (mΩ)]

R.V. (S.V.) [V] / Cap. [μF]	2.5 (2.8)			4.0 (4.6)		6.3 (7.2)			10 (11.5)	16 (18.4)		25 (28.7)
	SS	SA	SB	SA	SB	SS	SA	SB	SA	SS	SA	SS
10												6.3x5.7 (60)
22												6.3x5.7 (60)
27												6.3x5.7 (40)
47												6.3x5.7 (30)
100						6.3x5.7 (25)				6.3x5.7 (24)	6.3x7.7 (24)	
120									6.3x5.7 (18)			
220						6.3x5.7 (25)	6.3x5.7 (15)	6.3x5.7 (12)				
270							6.3x5.7 (14)					
330		6.3x5.7 (14)		6.3x5.7 (14)	6.3x5.7 (11)	6.3x5.7 (25)	6.3x5.7 (14)					
390		6.3x5.7 (14)	6.3x5.7 (10)	6.3x5.7 (14)								
470		6.3x5.7 (13)										
560	6.3x5.7 (25)	6.3x5.7 (13)	6.3x5.7 (10)									

●Dimensions



[Unit: mm]

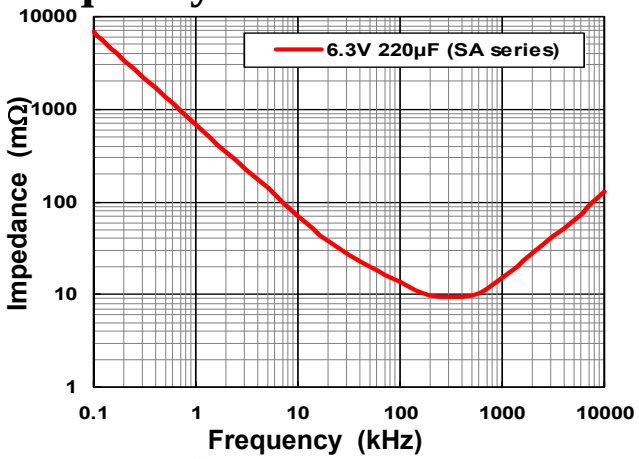
φD×L	W	H	C	R	P
6.3×5.7	6.5	6.5	7.2	0.5 to 0.9	2.1
6.3×7.7	6.5	6.5	7.2	0.5 to 0.9	2.1

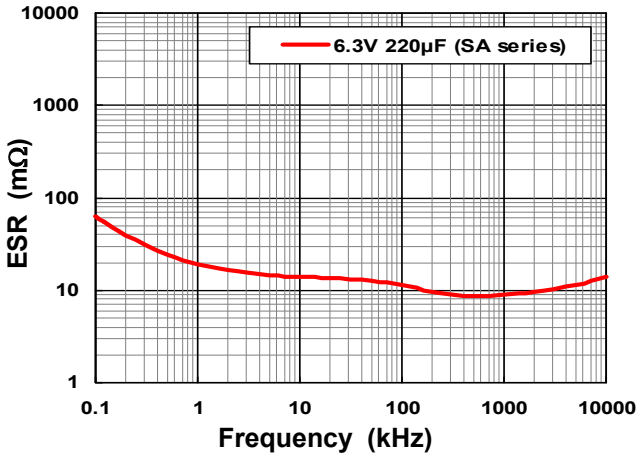
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number		Leakage Current* (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
		NICHICON	FPCAP					
2.5	330	RSA0E331MCN1GS	FP-2R5ME331M-SAR	700	0.12	14	3160	6.3 × 5.7
	390	RSA0E391MCN1GS	FP-2R5ME391M-SAR	700	0.12	14	3160	6.3 × 5.7
	390	RSB0E391MCN1GS	FP-2R5ME391M-SBR	700	0.12	10	3650	6.3 × 5.7
	470	RSA0E471MCN1GS	FP-2R5ME471M-SAR	700	0.12	13	3600	6.3 × 5.7
	560	RSS0E561MCN1GS	FP-2R5ME561M-SSR	700	0.12	25	2500	6.3 × 5.7
	560	RSA0E561MCN1GS	FP-2R5ME561M-SAR	700	0.12	13	3600	6.3 × 5.7
	560	RSB0E561MCN1GS	FP-2R5ME561M-SBR	700	0.12	10	3800	6.3 × 5.7
4.0	330	RSA0G331MCN1GS	FP-4R0ME331M-SAR	700	0.12	14	3160	6.3 × 5.7
	330	RSB0G331MCN1GS	FP-4R0ME331M-SBR	700	0.12	11	3700	6.3 × 5.7
	390	RSA0G391MCN1GS	FP-4R0ME391M-SAR	700	0.12	14	3160	6.3 × 5.7
6.3	100	RSS0J101MCN1GS	FP-6R3ME101M-SSR	700	0.12	25	2500	6.3 × 5.7
	220	RSS0J221MCN1GS	FP-6R3ME221M-SSR	700	0.12	25	2500	6.3 × 5.7
	220	RSA0J221MCN1GS	FP-6R3ME221M-SAR	700	0.12	15	3100	6.3 × 5.7
	220	RSB0J221MCN1GS	FP-6R3ME221M-SBR	700	0.12	12	3500	6.3 × 5.7
	270	RSA0J271MCN1GS	FP-6R3ME271M-SAR	700	0.12	14	3160	6.3 × 5.7
	330	RSS0J331MCN1GS	FP-6R3ME331M-SSR	700	0.12	25	2500	6.3 × 5.7
	330	RSA0J331MCN1GS	FP-6R3ME331M-SAR	700	0.12	14	3160	6.3 × 5.7
10	120	RSA1A121MCN1GS	FP-010ME121M-SAR	700	0.12	18	2900	6.3 × 5.7
16	100	RSS1C101MCN1GS	FP-016ME101M-SSR	700	0.12	24	2490	6.3 × 5.7
	100	RSA1C101MCN1GS	FP-016ME101M-SAR	700	0.12	24	2700	6.3 × 7.7
25	10	RSS1E100MCN1GS	FP-025ME100M-SSR	100	0.12	60	1700	6.3 × 5.7
	22	RSS1E220MCN1GS	FP-025ME220M-SSR	110	0.12	60	1700	6.3 × 5.7
	27	RSS1E270MCN1GS	FP-025ME270M-SSR	135	0.12	40	2100	6.3 × 5.7
	47	RSS1E470MCN1GS	FP-025ME470M-SSR	235	0.12	30	2800	6.3 × 5.7

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Frequency Characteristics





●Part Number (EX) 6.3V, 220μF, SA series

Nichicon P/N

R	SA	0J	221	M	CN	1	GS
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Taping code

FPCAP P/N

FP	—	6R3	ME	221	M	—	SA	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Taping code	Control code

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

FS series

Large Capacitance | φ4 , φ5 | Low ESR
SMD | Lead-free | RoHS Compliance

UPGRADE

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Long life and high reliability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

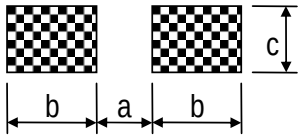
Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

Items		Characteristic
		FS
Operating temp. range		-55 to +105°C
Rated voltage range		2.5 to 25V·DC
Capacitance range		10 to 180μF
Capacitance tolerance		±20% (M)
Endurance	Test condition	105°C, rated voltage 2000Hrs.
	Capacitance	Within ±20% of initial value before test
	Leakage current	Not to exceed the initial specified value
	ESR	Not to exceed 150% of initial specified value
	tan δ	Not to exceed 150% of initial specified value
Failure Rate		0.5% / 1000Hrs. Max (60%CL)

●Recommended land pattern



[Unit: mm]

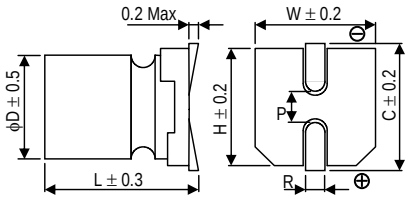
φD	a	b	c
4	1.0	2.6	1.6
5	1.4	3.0	1.6

●Size List

[φD×L]

Cap. [μF] \ R.V. (S.V.) [V]	2.5 (2.8)	4.0 (4.6)	6.3 (7.2)	10 (11.5)	16 (18.4)	25 (28.7)
10				4×5.2		
22					5×5.7	5×5.7
33					5×5.7	
39					5×5.7	
47			5×5.7			
68				5×5.7		
100		5×5.7	5×5.7			
120			5×5.7			
150		5×5.7				
180	5×5.7					

●Dimensions



[Unit: mm]

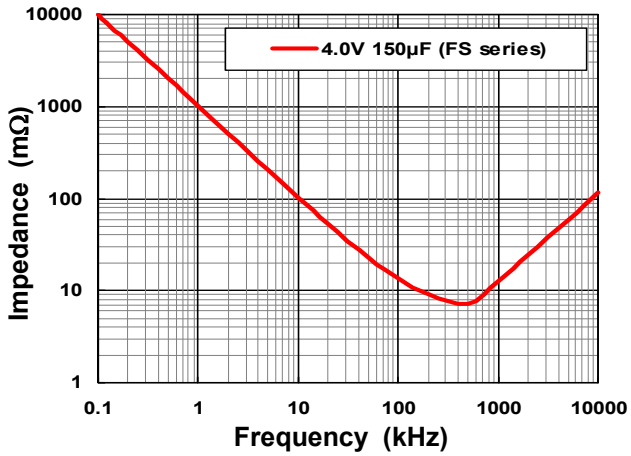
φD×L	W	H	C	R	P
4×5.2	4.3	4.3	5.1	0.5 to 0.9	1.0
5×5.7	5.3	5.3	5.9	0.5 to 0.9	1.4

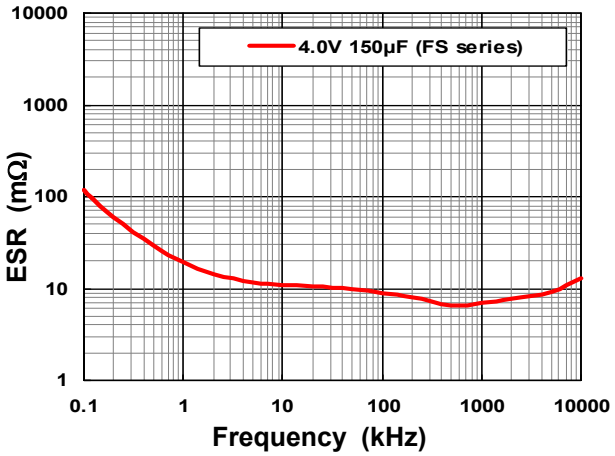
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number NICHICON	Part Number FPCAP	Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
2.5	180	RFS0E181MCN1GS	FP-2R5ME181M-FSR	300	0.12	21	2670	5 × 5.7
4.0	100	RFS0G101MCN1GS	FP-4R0ME101M-FSR	300	0.12	22	2610	5 × 5.7
	150	RFS0G151MCN1GS	FP-4R0ME151M-FSR	300	0.12	22	2610	5 × 5.7
6.3	47	RFS0J470MCN1GS	FP-6R3ME470M-FSR	300	0.12	30	2000	5 × 5.7
	100	RFS0J101MCN1GS	FP-6R3ME101M-FSR	300	0.12	24	2500	5 × 5.7
	120	RFS0J121MCN1GS	FP-6R3ME121M-FSR	300	0.12	24	2500	5 × 5.7
10	10	RFS1A100MCN1GB	FP-010ME100M-FSR	100	0.12	220	700	4 × 5.2
	68	RFS1A680MCN1GS	FP-010ME680M-FSR	300	0.12	30	2000	5 × 5.7
16	22	RFS1C220MCN1GS	FP-016ME220M-FSR	100	0.12	45	1210	5 × 5.7
	33	RFS1C330MCN1GS	FP-016ME330M-FSR	105	0.12	35	2070	5 × 5.7
	39	RFS1C390MCN1GS	FP-016ME390M-FSR	125	0.12	35	2070	5 × 5.7
25	22	RFS1E220MCN1GS	FP-025ME220M-FSR	300	0.12	40	2200	5 × 5.7

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Frequency Characteristics





●Part Number (EX) 2.5V, 180μF, FS series

Nichicon P/N

R	FS	0E	181	M	CN	1	GS
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Taping code

Taping code:
GB: Height under 5.2mm
GS: Height over 5.7mm

FPCAP P/N

FP	—	2R5	ME	181	M	—	FS	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Taping code	Control code

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

SL series

Low Profile | 4.5mmMax | ϕ6.3
Large Capacitance | Lead-free | RoHS Compliance

UPGRADE

●Features

By using Functional Polymer cathode, Frequency & Temp. characteristics are greatly improved.

- Low ESR at a high frequency range.
- High ripple current capability.
- Low profile type. (Height : 4.5mmMax.)

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

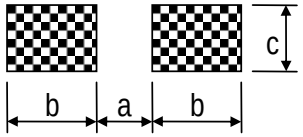
Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

Items		Characteristic
		SL
Operating temp. range		-55 to +105°C
Rated voltage range		2.5 to 25V·DC
Capacitance range		15 to 330μF
Capacitance tolerance		±20% (M)
Endurance	Test condition	105°C, rated voltage 2000Hrs.
	Capacitance	Within ±20% of initial value before test
	Leakage current	Not to exceed the initial specified value
	ESR	Not to exceed 150% of initial specified value
	tan δ	Not to exceed 150% of initial specified value
Failure Rate		0.5% / 1000Hrs. Max (60%CL)

●Recommended land pattern



[Unit: mm]

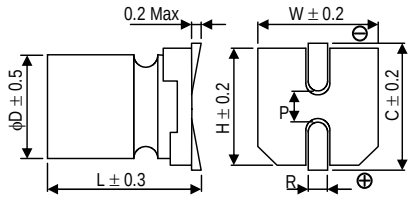
ϕD	a	b	c
6.3	2.1	3.5	1.6

●Size (ESR) List

[ϕD×L (mΩ)]

R.V. (S.V.) [V] / Cap. [μF]	2.5 (2.8)	6.3 (7.2)	16 (18.4)	25 (28.7)
15			**6.3x4.2 (45)**	**6.3x4.2 (55)**
100	**6.3x4.2 (16)**	**6.3x4.2 (18)**		
150		**6.3x4.2 (18)**		
220	**6.3x4.2 (16)**	**6.3x4.2 (18)**		
330	**6.3x4.2 (16)**			

●Dimensions



[Unit: mm]

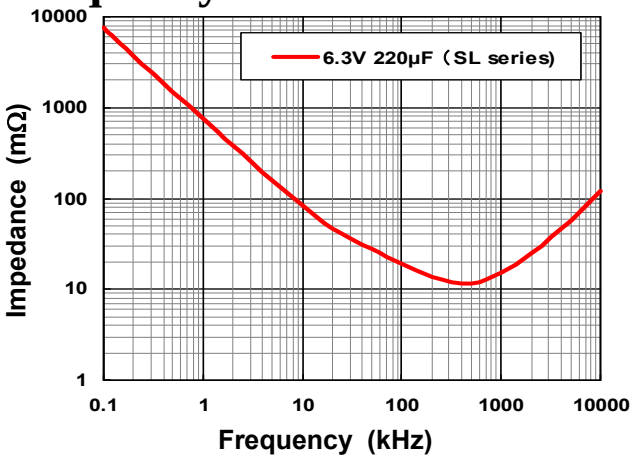
ϕD×L	W	H	C	R	P
6.3×4.2	6.5	6.5	7.2	0.5 to 0.9	2.1

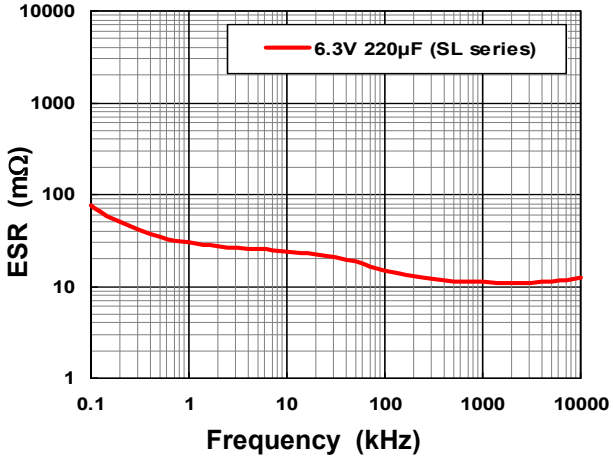
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number		Leakage Current * (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Case Size φD×L(mm)
		NICHICON	FPCAP					
2.5	100	RSL0E101MCN1GB	FP-2R5ME101M-SLR	300	0.12	16	3500	6.3 × 4.2
	220	RSL0E221MCN1GB	FP-2R5ME221M-SLR	300	0.12	16	3500	6.3 × 4.2
	330	RSL0E331MCN1GB	FP-2R5ME331M-SLR	413	0.12	16	3500	6.3 × 4.2
6.3	100	RSL0J101MCN1GB	FP-6R3ME101M-SLR	315	0.12	18	3200	6.3 × 4.2
	150	RSL0J151MCN1GB	FP-6R3ME151M-SLR	473	0.12	18	3200	6.3 × 4.2
	220	RSL0J221MCN1GB	FP-6R3ME221M-SLR	693	0.12	18	3200	6.3 × 4.2
16	15	RSL1C150MCN1GB	FP-016ME150M-SLR	300	0.12	45	1900	6.3 × 4.2
25	15	RSL1E150MCN1GB	FP-025ME150M-SLR	100	0.12	55	1700	6.3 × 4.2

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Frequency Characteristics





●Part Number (EX) 2.5V, 330μF, SL series

Nichicon P/N

R	SL	0E	331	M	CN	1	GB
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration	Control code	Taping code

FPCAP P/N

FP	—	2R5	ME	331	M	—	SL	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Taping code	Control code

nichicon

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

VA & VB series

SMD | 7.3×4.3×2.8 | 3mm Height | Low ESR | Lead-free | RoHS Compliance

NEW

●Features

By using Aluminum Functional Polymer.

- Low ESR at a high frequency range.
- High ripple current capability.

●Applications

- Switching Power Supply and DC/DC Converter.
- Back up Power Supplies of CPU(VRM etc.)
- Miniature high Power Supply.

●Environmental Correspondence

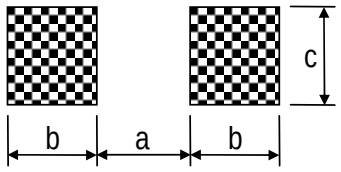
Any environmental hazardous substances are not used.

- The lead free of terminal plating (Sn 100%)

●Specifications

Items		Characteristic
		VA , VB
Operating temp. range		-55 to +105°C
Rated voltage range		2.5 to 25V·DC
Capacitance range		15 to 220μF
Capacitance tolerance		±20% (M)
Endurance	Test condition	105°C, rated voltage 1000Hrs.
	Capacitance	Within ±20% of initial value before test
	Leakage current	Not to exceed the initial specified value
	tan δ	Not to exceed 150% of initial specified value
Damp Heat	Test condition	60°C,90~95%RH, No Bias, 500Hrs.
	Capacitance	Within +50%-20% of initial value before test
	Leakage current	Not to exceed 300% of initial specified value
	tan δ	Not to exceed 200% of initial specified value
Failure Rate		0.5% / 1000Hrs. Max (60%CL)

●Recommended land pattern



[Unit: mm]

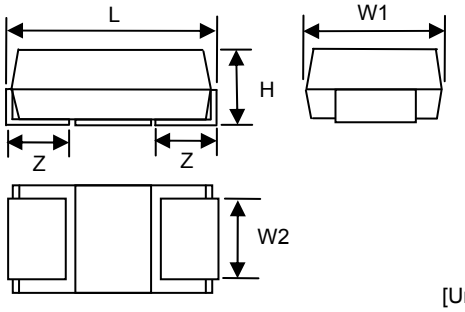
Size Code L × W × H	a	b	c
N 7.3 × 4.3 × 2.8	4.1	2.05	2.9

●Size Code (ESR) List

[Size Code (mΩ)]

R.V. (S.V.) [V] / Cap. [μF]	2.5 (2.8)		4.0 (4.6)		6.3 (7.2)		16 (18.4)	25 (28.7)
	VA	VB	VA	VB	VA	VB	VA	VA
15								N (60)
27							N (55)	
33							N (55)	
100					N (25)	N (20)		
150			N (18)	N (15)				
220	N (18)	N (15)						

●Dimensions



[Unit: mm]

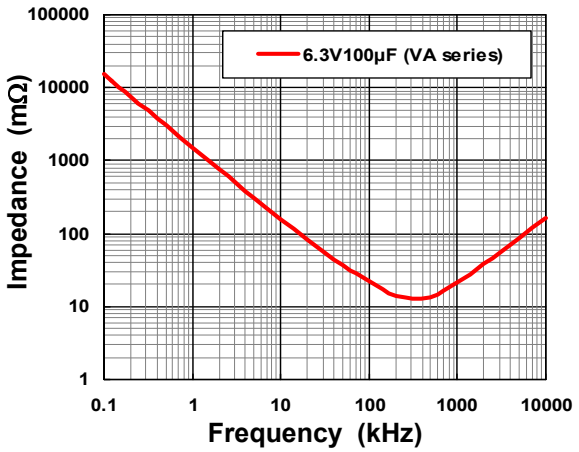
Size Code L × W × H	L±0.2	W1±0.2	W2±0.1	H±0.2	Z±0.2
N 7.3 × 4.3 × 2.8	7.3	4.3	2.4	2.8	1.3

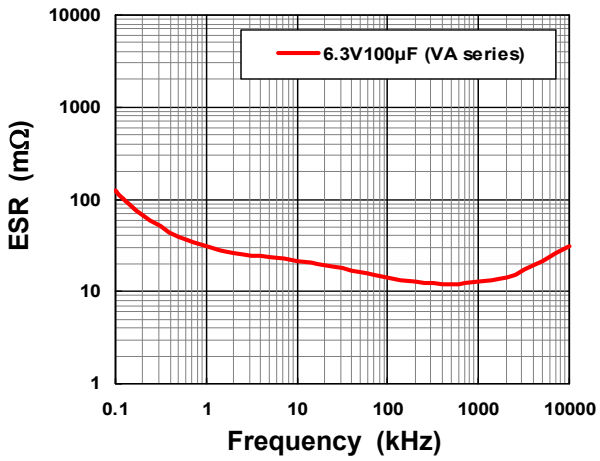
●Part number & Specifications

Rated Voltage (V)	Rated Capacitance (μF, 120Hz)	Part Number		Leakage Current* (μA, 2 min)	tanδ (120Hz)	ESR (mΩ, 100kHz)	Rated Ripple Current (mA, r.m.s.)	Size L×W×H(mm)	MSL (J-STD-020D)
		NICHICON	FPCAP						
2.5	220	RVA0E221MNG	FP-2R5CM221M-VAR	700	0.12	18	2600	7.3 × 4.3 × 2.8	Level 3
	220	RVB0E221MNG	FP-2R5CM221M-VBR	700	0.12	15	2800	7.3 × 4.3 × 2.8	Level 3
4.0	150	RVA0G151MNG	FP-4R0CM151M-VAR	700	0.12	18	2600	7.3 × 4.3 × 2.8	Level 3
	150	RVB0G151MNG	FP-4R0CM151M-VBR	700	0.12	15	2800	7.3 × 4.3 × 2.8	Level 3
6.3	100	RVA0J101MNG	FP-6R3CM101M-VAR	700	0.12	25	2000	7.3 × 4.3 × 2.8	Level 3
	100	RVB0J101MNG	FP-6R3CM101M-VBR	700	0.12	20	2400	7.3 × 4.3 × 2.8	Level 3
16	27	RVA1C270MNG	FP-016CM270M-VAR	216	0.12	55	1100	7.3 × 4.3 × 2.8	Level 3
	33	RVA1C330MNG	FP-016CM330M-VAR	264	0.12	55	1100	7.3 × 4.3 × 2.8	Level 3
25	15	RVA1E150MNG	FP-025CM150M-VAR	188	0.12	60	1000	7.3 × 4.3 × 2.8	Level 3

* In case of some doubt about measured values, measure after applying rated voltage for 120 minutes at 105°C.

●Frequency Characteristics





●Part Number (EX) 6.3V, 100μF, VA series

Nichicon P/N

R	VA	0J	101	M	N	G	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Size Code (N: 7.3×4.3×2.8)	Taping code	Control code

FPCAP P/N

FP	—	6R3	CM	101	M	—	VA	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Taping code	Control code

nichicon

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

Type numbering system (Example:2.5V560μF L8)

Nichicon Part Number

R	L8	0E	561	M	DN	1	
Type	Series name	Rated Voltage	Rated Capacitance	Capacitance Tolerance	Configuration (VA/VB series Size Code :N)	Control code	Taping & Lead Forming

FPCAP Part Number

FP	—	2R5	RE	561	M	—	L8	R	
Commodity Mark		Rated Voltage	Classification	Rated Capacitance	Capacitance Tolerance		Series name	Taping & Lead Forming	Control code

Type & Classification

Type & Classification	Nichicon P/N Symbol	FPCAP P/N Symbol
Radial Lead Type	R	RE
SMD Type		ME
		CM

Series Name

Classification	Series
Radial Lead Type	*NS*
	R7
	R5
	L8
	E5
	S8
	F8
	NU
	NE
	S6
	HT
SMD Type	*PS, PA*
	HS, HA
	SS, SA, SB
	FS
	SL
	VA, VB

Rated Voltage

Voltage [V]	Nichicon P/N Symbol	FPCAP P/N Symbol
2.5	0E	2R5
4.0	0G	4R0
6.3	0J	6R3
10	1A	010
16	1C	016
20	1D	020
25	1E	025
35	1V	035
50	1H	050
63	1J	063

Rated Capacitance

Capacitance [μF]	Symbol
8.2	8R2
10	100
22	220
100	101
220	221
1500	152

Capacitance Tolerance

Tolerances	Symbol
± 20%	M

Control code*

Endurance	Nichicon P/N Symbol	FPCAP P/N Symbol
5000hrs	ASQ	-5K
2000hrs	1	no sign
VA/VB series	no sign	no sign

* In case of endurance

Taping & Lead Forming

Classification	Taping & Lead Forming	Case Size (mm)	Nichicon P/N Symbol	FPCAP P/N Symbol
Radial Lead Type	Long lead (Bulk)	All	no sign	R
	Cut lead (Bulk)	All	CG	CG
	2.5mm pitch taping	φ5×8, φ6.3×5 to 8	JT	JT
		φ5×10, φ6.3×10	JX	J
	3.5mm pitch taping	φ8	KX	K
	5.0mm pitch taping	φ5, φ6.3, φ8	PX	P
		φ10	PH	PH
SMD Type	Taping	Height under 5.2mm	GB	R
		Height over 5.7mm	GS	
		7.3×4.3×2.8	G	
	Bulk	All	no sign	N

FPCAP *Functional Polymer Aluminum Solid Electrolytic Capacitors*

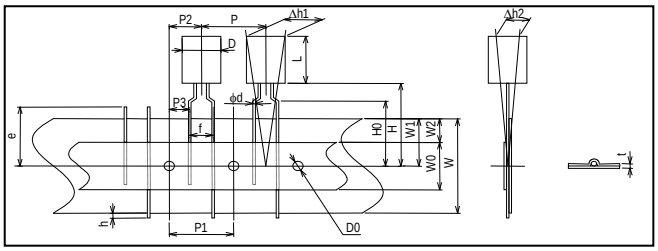
Ammo Pack Taping Specifications (Radial lead type)

Taping Dimensions

Lead Forming (Symbol: Ex. PX) Nichicon P/N Symbol : R□□□□□□□ M□□1 PX
FPCAP P/N Symbol : FP-□□□RE□□□M-□□ P

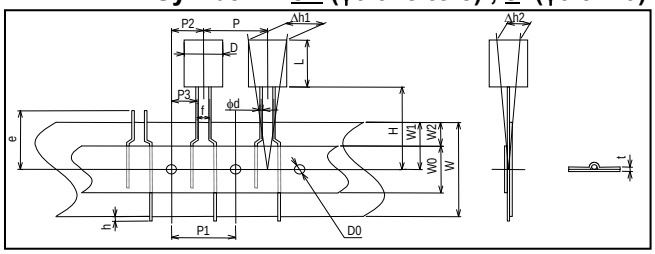
2.5mm pitch taping
Taping Dimensions for φ5

Nichicon P/N Symbol : JT (φ5×8) , JX (φ5×10)
FPCAP P/N Symbol : JT (φ5×8) , J (φ5×10)



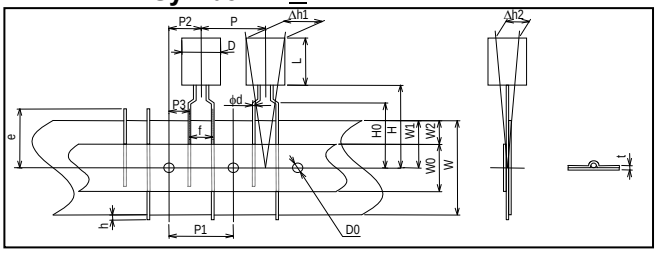
2.5mm pitch taping
Taping Dimensions for φ6.3

Nichicon P/N Symbol : JT (φ6.3×5 to 8) , JX (φ6.3×10)
FPCAP P/N Symbol : JT (φ6.3×5 to 8) , J (φ6.3×10)



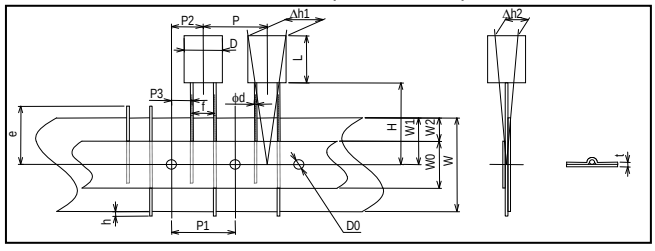
5.0mm pitch taping
Taping Dimensions for φ5, φ6.3, φ8

Nichicon P/N Symbol : PX
FPCAP P/N Symbol : P



3.5mm(φ8) or 5.0mm(φ10) pitch taping
Taping Dimensions for φ8, φ10

Nichicon P/N Symbol : KX (φ8) , PH (φ10)
FPCAP P/N Symbol : K (φ8) , PH (φ10)



Specification Table

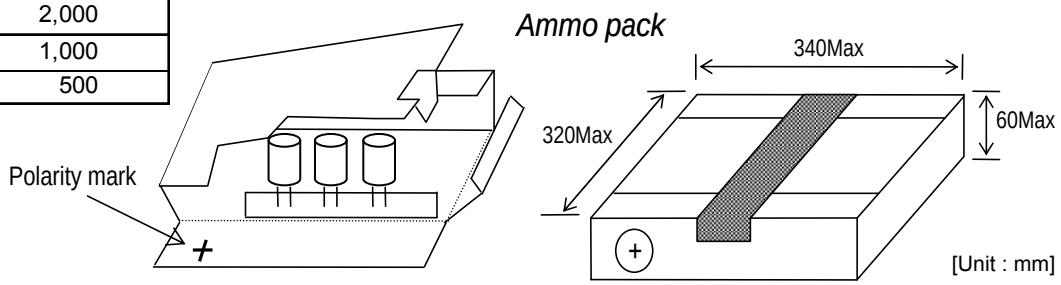
[Unit : mm]

Item \ φD×L	6.3×6, 6.3×7	5×8, 6.3×8	6.3×5	5×10, 6.3×10	6.3×6, 6.3×7	5×8, 6.3×8	5×10, 6.3×5, 6.3×10	8×6 , 8×8 , 8×9 , 8×11.5		10×12.5
Lead Forming Symbol (Nichicon P/N)	JT			JX	PX			PX	KX	PH
Lead Forming Symbol (FPCAP P/N)	JT			J	P			P	K	PH
Lead Wire Diameter φd	0.45	0.6	0.5	0.5	0.45	0.6	0.5	0.6	0.6	0.6
Tolerance	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
Lead Wire Interval f	2.5 +0.8/-0.2 (φ6.3: 2.5±0.5)				5.0 +0.8/-0.2			5.0 +0.8/-0.2	3.5 +0.8/-0.2	5.0 +0.8/-0.2
Pitch Between Components P	12.7±1.0				12.7±1.0			12.7±1.0	12.7±1.0	12.7±1.0
Feed Holes Position Gap P1	12.7±0.3				12.7±0.3			12.7±0.3	12.7±0.3	12.7±0.3
Feed Holes Position Gap P2	6.35±1.0				6.35±1.0			6.35±1.0	6.35±0.5	6.35±0.5
Lead Wire Clinch Height H0	-				16.0±0.5			16.0±0.5	-	-
Components Height H	18.5±0.5				17.5±0.5			20.0±0.75	20.0±0.5	18.5±0.5
Base Tape W	18.0 +1.0/-0.5				18.0 +1.0/-0.5			18.0 +1.0/-0.5	18.0 +1.0/-0.5	18.0 +1.0/-0.5
Feed Holes Position Gap W1	9.0±0.5				9.0±0.5			9.0±0.5	9.0±0.5	9.0±0.5
Feed Hole Diameter D0	4.0±0.2				4.0±0.2			4.0±0.2	4.0±0.2	4.0±0.2
Components Alignment Δh	2.0 max				2.0 max			2.0 max	2.0 max	2.0 max
Tape Thickness t	0.7±0.2				0.7±0.2			0.7±0.2	0.7±0.2	0.7±0.2

Ammo Pack Quantity Unit

Packing Quantity (Ammo Pack)

Size (dia)	Packing Unit (pcs / Ammo Pack)
φ5	2,000
φ6.3	2,000
φ8	1,000
φ10	500



The lid of feeding side of the taping box shall be torn off at the perforation line.

Bulk Packing Quantity Unit (Radial lead type)

Components are packaged as per following packing unit.

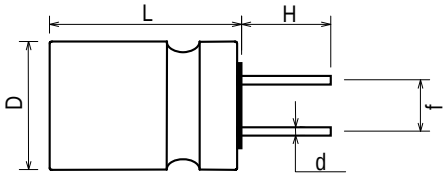
Packing Quantity (Bulk)

Case Size φD×L (mm)	Long Lead		Cut Lead	
	Inner Bag (pcs)	Packing Unit (pcs / Carton Box)	Inner Bag (pcs)	Packing Unit (pcs / Carton Box)
4×5	200	8,000	200	8,000
5×8, 5×10	200	3,200	200	4,000
6.3×5, 6.3×6, 6.3×7	200	4,000	200	4,000
6.3×8, 6.3×10	200	3,200	200	4,000
8×6, 8×8, 8×9	200	3,200	200	4,000
8×11.5	100	2,000	200	2,400
10×12.5	100	1,600	100	2,000

Note:Please inquire for FPCAP by Packing Unit as above.

Cut lead (Bulk) Dimensions

Lead Forming (Symbol: CG)
Nichicon P/N
: R□□□□□□□ M□□1 CG
FPCAP P/N
: FP-□□□RE□□□M-□□ CG



[Unit: mm]

Item \ φD×L	4×5	5×8, 5×10	6.3×5, 6.3×6 6.3×7, 6.3×8, 6.3×10	8×6, 8×8, 8×9, 8×11.5	10×12.5
Lead Forming Symbol	**CG**	**CG**	**CG**	**CG**	**CG**
Lead Wire Diameter φd	0.45±0.05	0.6, 0.5±0.05	0.45, 0.6, 0.5±0.05	0.6±0.05	0.6±0.05
Lead Wire Length H	3.1±0.3	3.1±0.3	3.1±0.3	3.1±0.3	3.1±0.3
Lead Wire Interval f	1.5±0.5	2.0±0.5	2.5±0.5	3.5±0.5	5.0±0.5

Packaging Unit Quantity for a Reel (SMD type)

Components are packaged as per following packing unit

Packing Quantity (Reel)

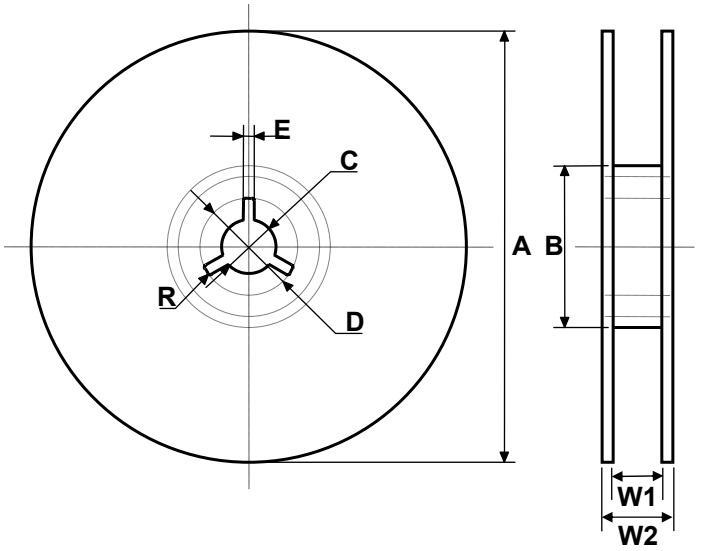
PS, PA, HS, HA, SS, SA, SB, FS, SL series

Case Size ϕD×L (mm)	Reel (pcs)
4×5.2	2,000
5×5.7	1,000
6.3×4.2	1,000
6.3×5.7	1,000
6.3×7.7	900
8×6.7	1,000
8×7.7	900
8×8.7	500
8×11.7	500
10×7.7	500
10×12.4	400

VA,VB series

Case Size L×W×H (mm)	Reel (pcs)
7.3×4.3×2.8	2,500

Note:Please inquire for FPCAP by Packing Unit as above.



Dimensions of Reel

PS, PA, HS, HA, SS, SA, SB, FS, SL series

[Unit : mm]

Size (dia)	A ±2.0	B ±1.0	C ±0.5	D ±1.0	E ±0.5	W1 ±0.8	W2 ±0.8	R
ϕ4, ϕ5	380	80	13.0	21	2.0	13.4	17.4	1.0
ϕ6.3	380	80	13.0	21	2.0	17.4	21.4	1.0
ϕ8, ϕ10	380	80	13.0	21	2.0	25.4	29.4	1.0

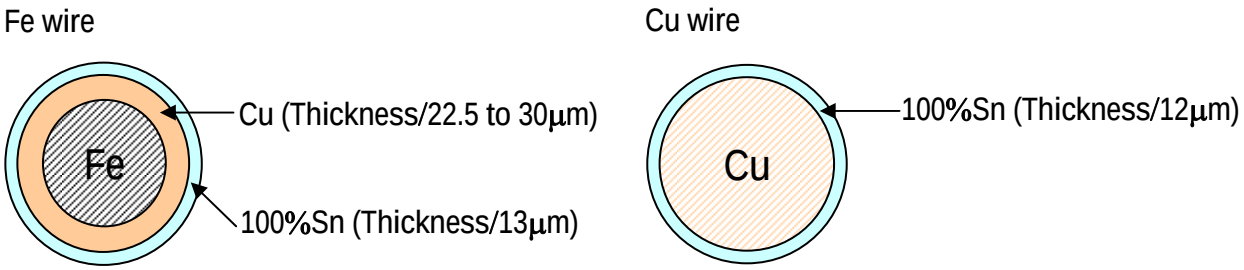
VA, VB series

Size L×W×H	A ±2.0	B ±1.0	C ±0.5	D ±1.0	E ±0.5	W1 ±1.0	W2 ±1.0	R
7.2×4.3×2.8	330	80	13.0	21	2.0	13.4	17.4	1.0

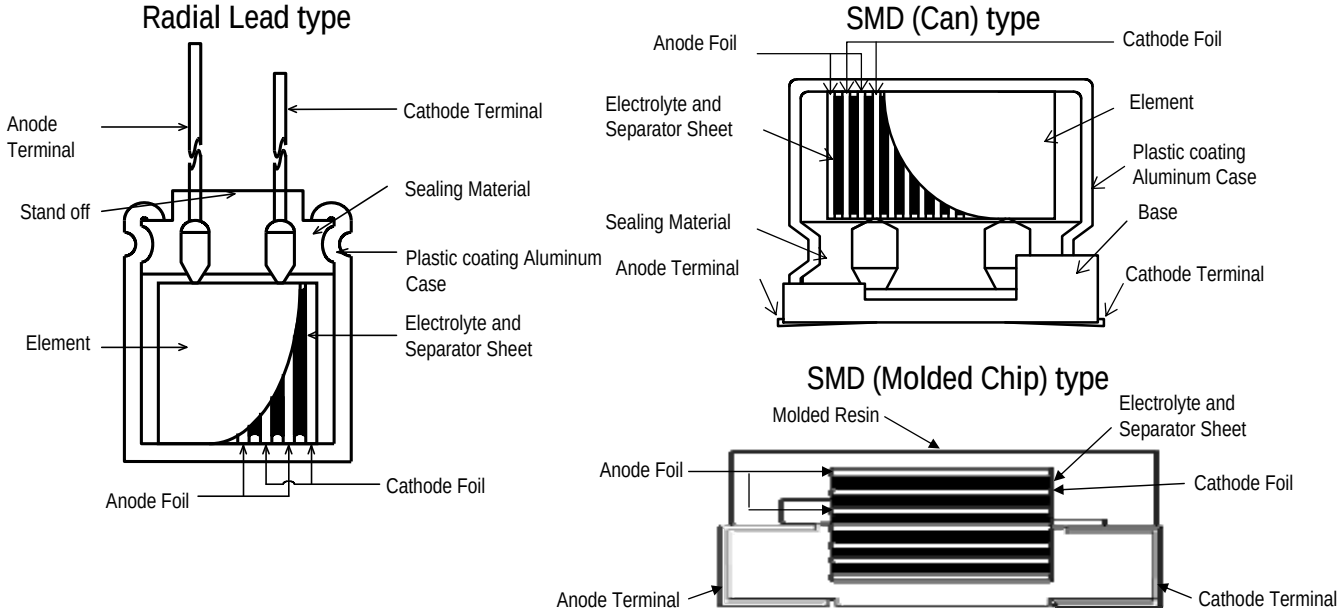
FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

Materials

Terminals



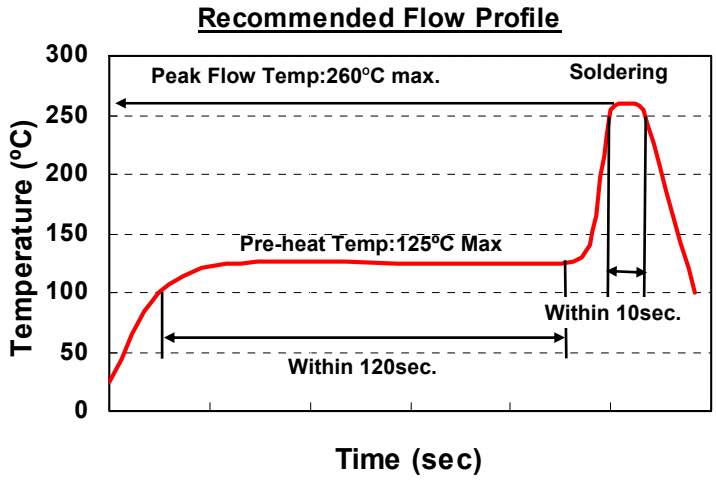
Compositions



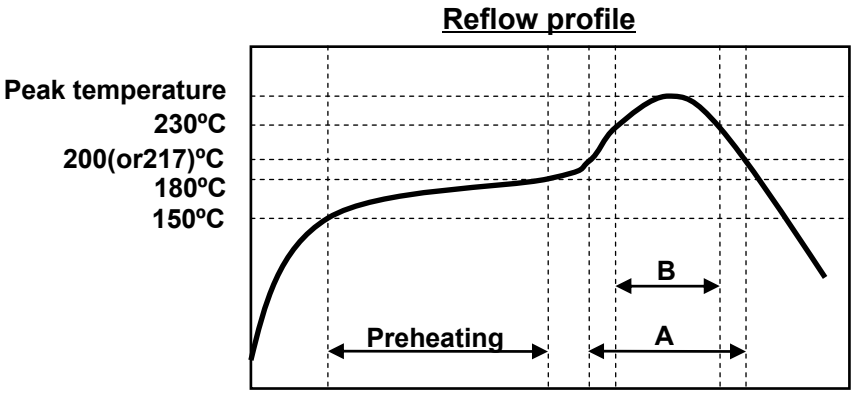
Composition Part	Materials		
	Radial Lead type	SMD type	
		Can type	Molded Chip type
Anode Foil	Aluminum		
Cathode Foil	Aluminum		
Separator Sheet	Electrolytic Capacitor Paper		
Electrolyte	Functional Polymer		
Terminal	1)Iron Lead + Copper Plating + Tin Plating 2)Copper Lead + Tin Plating	Copper Lead + Tin Plating	
Aluminum Case	Aluminum + Plastic		-
Sealing Material	Rubber		-
Base	-	Plastic	-
Molded Resin	-	-	Epoxy Resin

Soldering Profile

Flow Soldering (Radial lead type)



Reflow Soldering (SMD type)

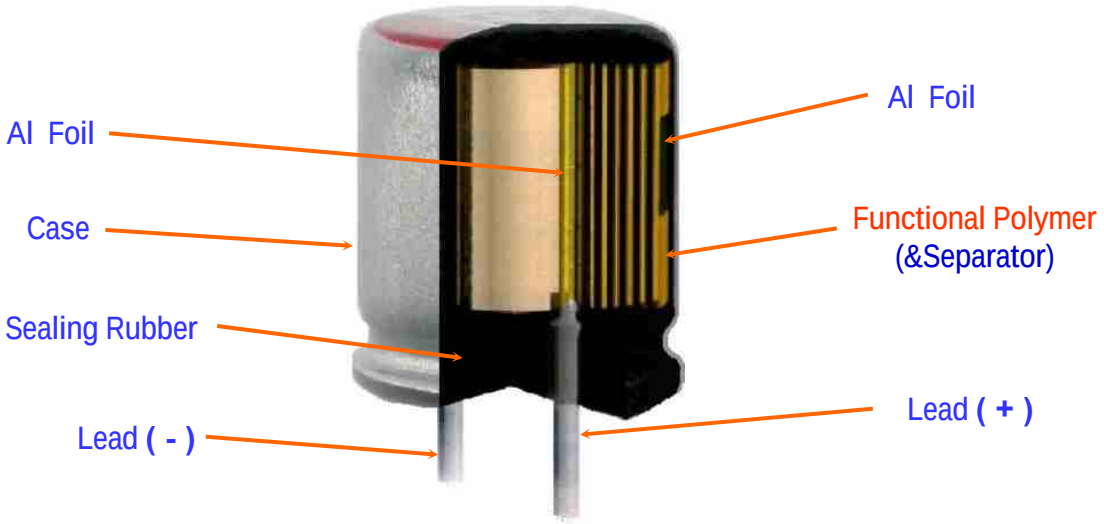


Item	PS, PA, HS, HA, SS, SA, SB, FS, SL		VA, VB	
	Recommended Condition 1	Recommended Condition 2	Recommended Condition 3	Recommended Condition 4
Peak Temperature	260°C or less	250°C or less	260°C or less (Within 5 seconds)	250°C or less (Within 5 seconds)
Preheating	150°C to 180°C Within 90 seconds	150°C to 180°C Within 90 seconds	150°C to 180°C Within 90 seconds	150°C to 180°C Within 120 seconds
A	200°C and higher Within 60 seconds	200°C and higher Within 60 seconds	217°C and higher Within 60 seconds	217°C and higher Within 60 seconds
B	230°C and higher Within 40 seconds	230°C and higher Within 40 seconds	-	-
The number of reflow	Only 1 time	Twice or less	Only 1 time	Twice or less

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

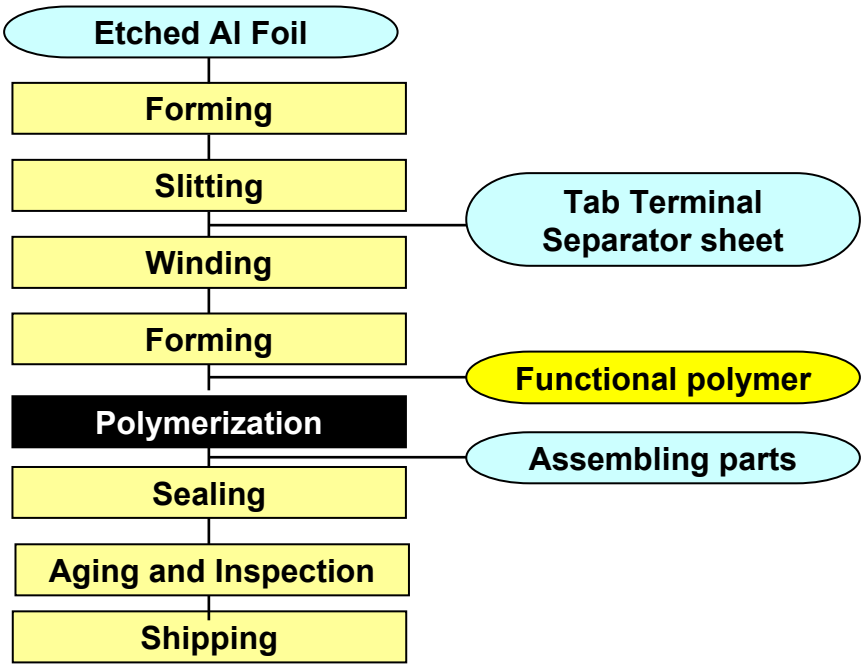
Construction and Characteristics of FPCAP

Construction of FPCAP

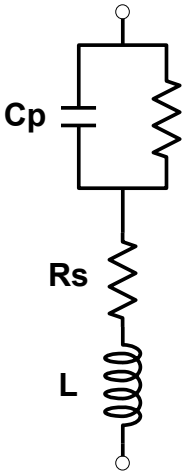


FPCAP is roughly the same construction as an aluminum electrolytic capacitor, and uses rolled aluminum foils in its capacitor element.

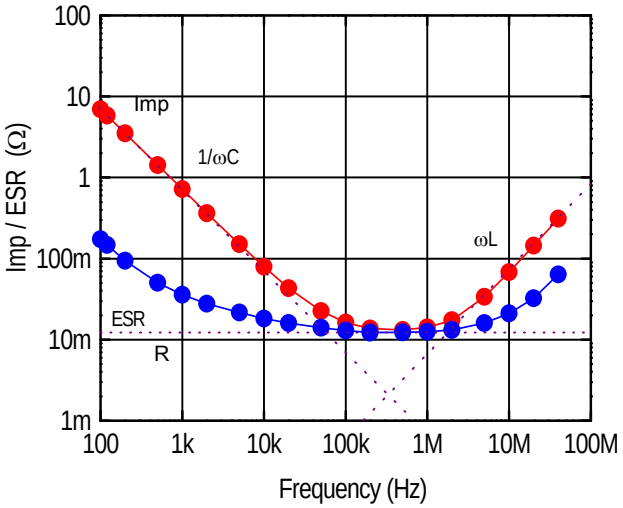
Manufacturing Process of FPCAP



Equivalent Circuit of Capacitor

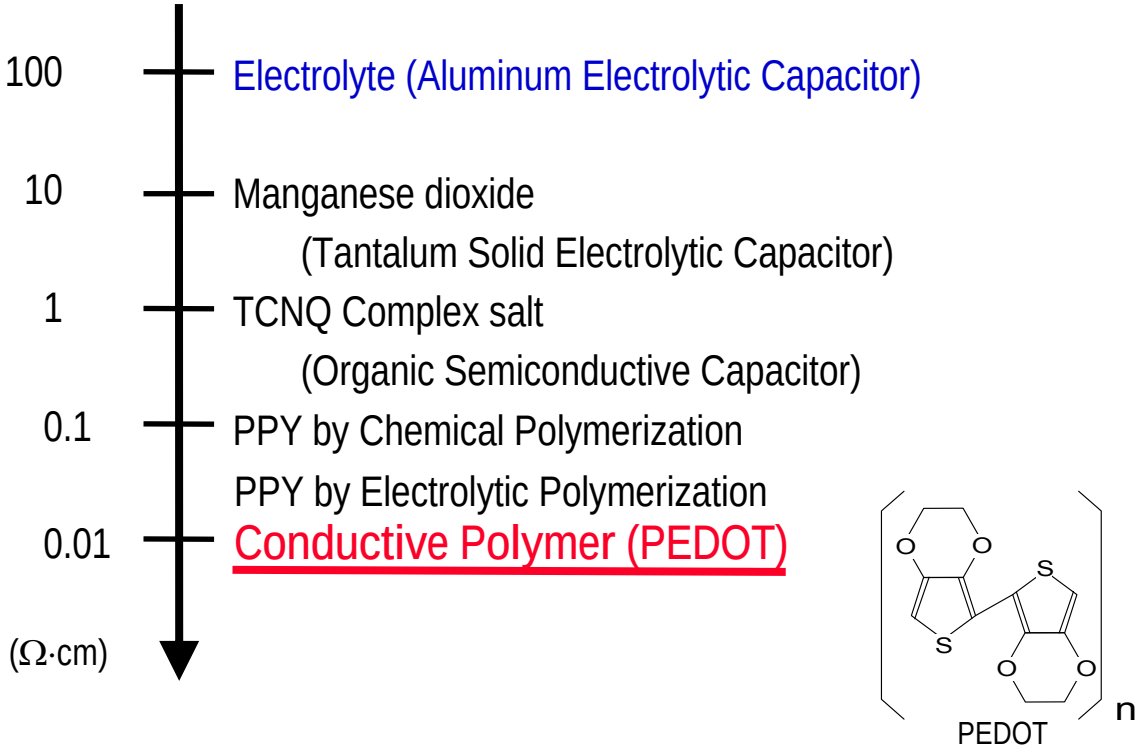


Cp : Capacitance
Rp : Equivalent parallel resistance
(Insulation resistance)
(≅Rated Voltage/LC)
Rs : Equivalent series resistance
L : Inductance



$$|Z| = \sqrt{\left\{Rs + \frac{Rp}{(1+\omega^2 Cp^2 Rp^2)}\right\}^2 + \left\{\omega L - \frac{\omega Cp Rp^2}{(1+\omega^2 Cp^2 Rp^2)}\right\}^2}$$

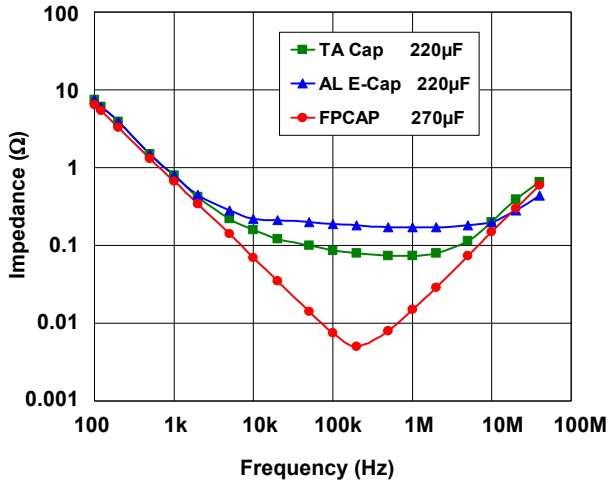
Feature of Functional Polymer

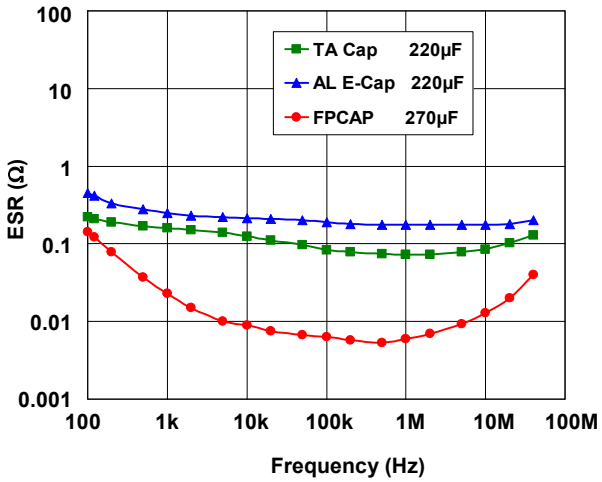


FPCAP differs from the aluminum electrolytic capacitor in that in place of the electrolyte, functional polymer is impregnated.

Typical Electrical Characteristics of Capacitors

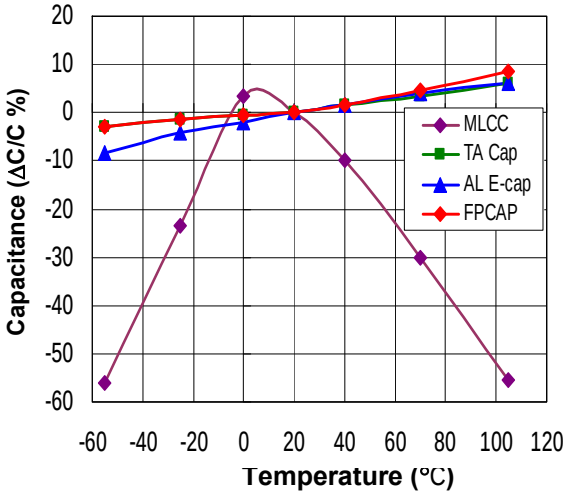
Frequency Dependence

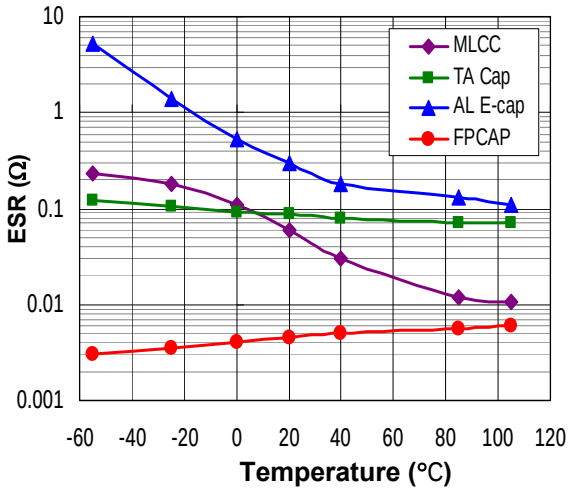




FPCAP has excellent frequency characteristic nearly equal to the film capacitor.
Using the high conductivity of the Functional polymer with an electrolyte, and adopting the winding element for layer thinness of electrolyte, the ESR is improved greatly and has the frequency characteristic that is nearly equal to the film capacitor.

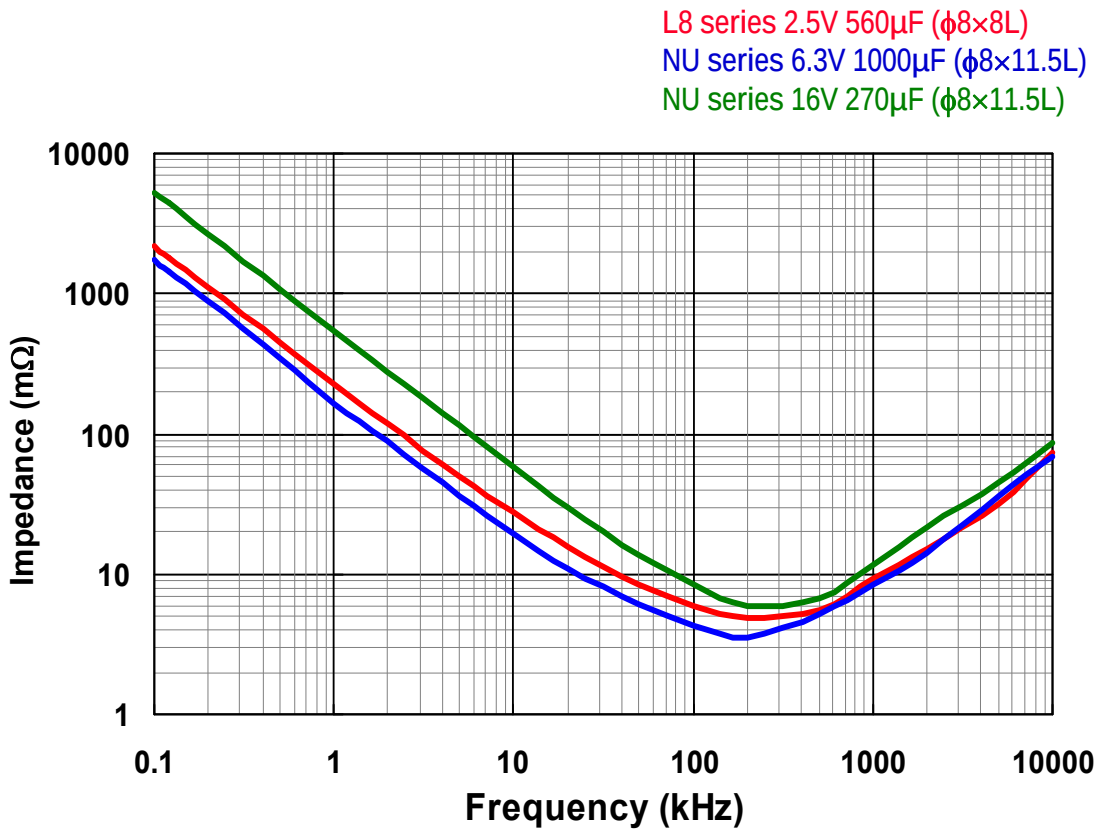
Typical Temperature Dependence of Capacitors

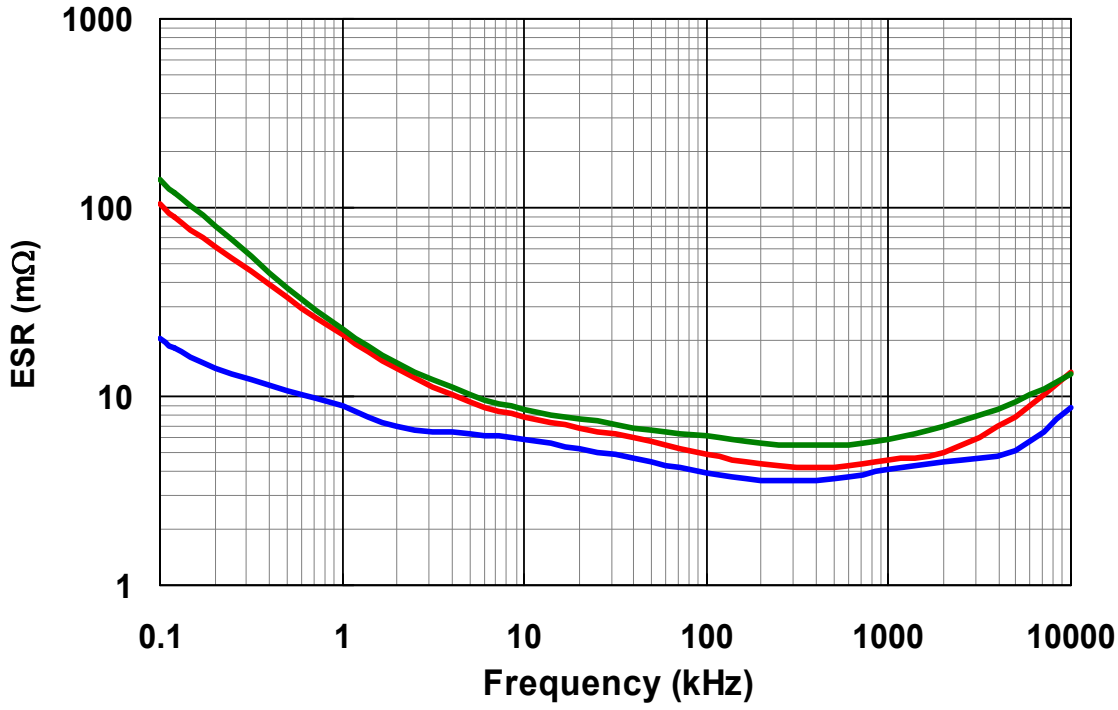




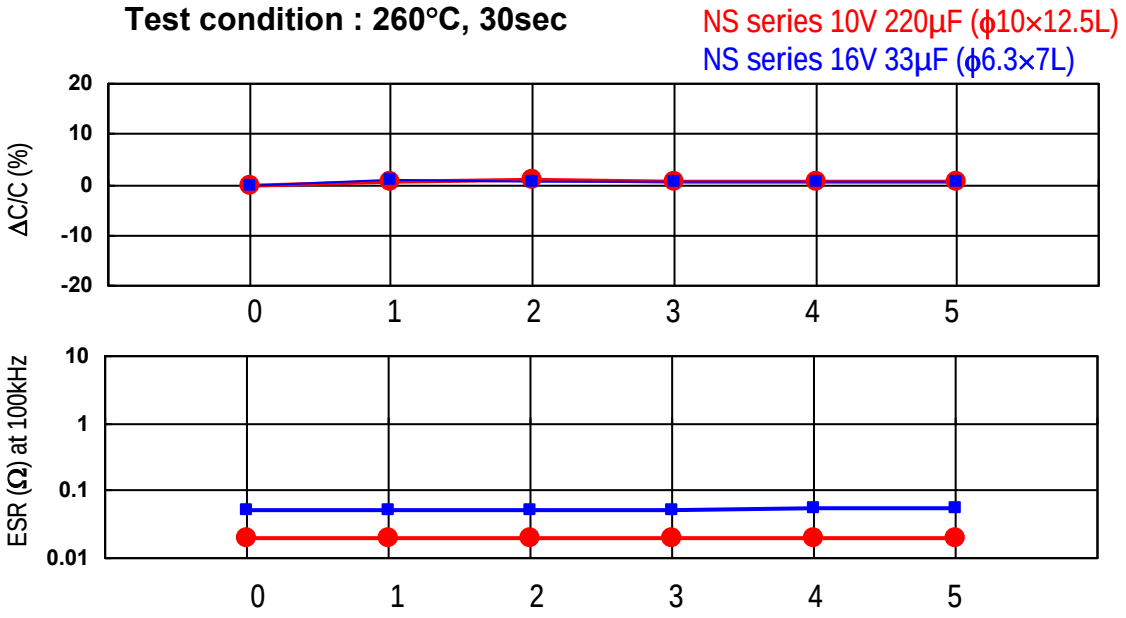
The temperature dependence of the FPCAP is that it features little change in temperature for the ESR.
Since ESR is dominant at high range of impedance (near resonance point), the ESR value greatly affects Noise clearing capacity.
What ESR changes little against temperature means that Noise clearing ability changes little against temperature as well.

Frequency Dependence

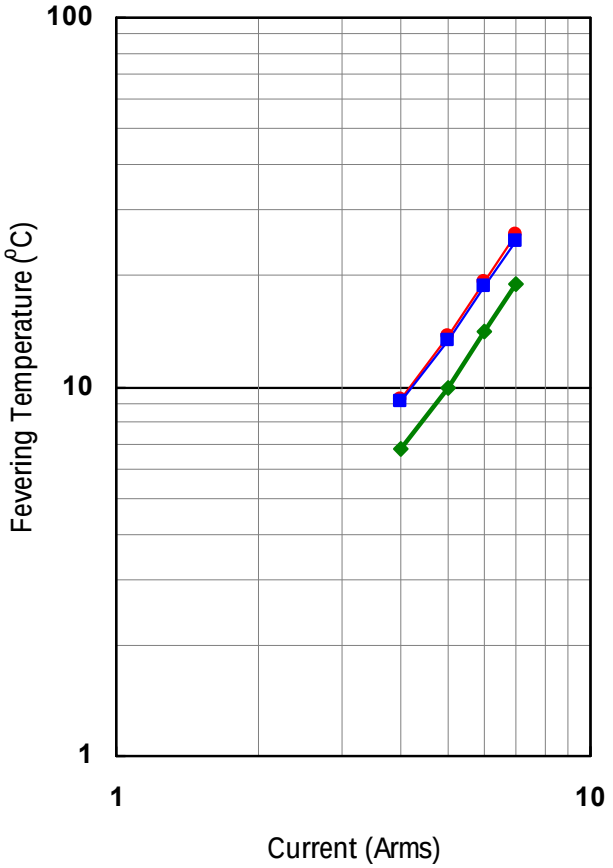




Resistance to Soldering Heat



Fevering Temperature by Ripple Current



L8 series 2.5V 560µF (ϕ8×8L)
R7 series 2.5V 820µF (ϕ8×11.5L)
R7 series 4.0V 820µF (ϕ10×12.5L)

$I^2R = \Delta T \times \beta \times S = \Delta Tc \times \alpha \times \beta \times S$

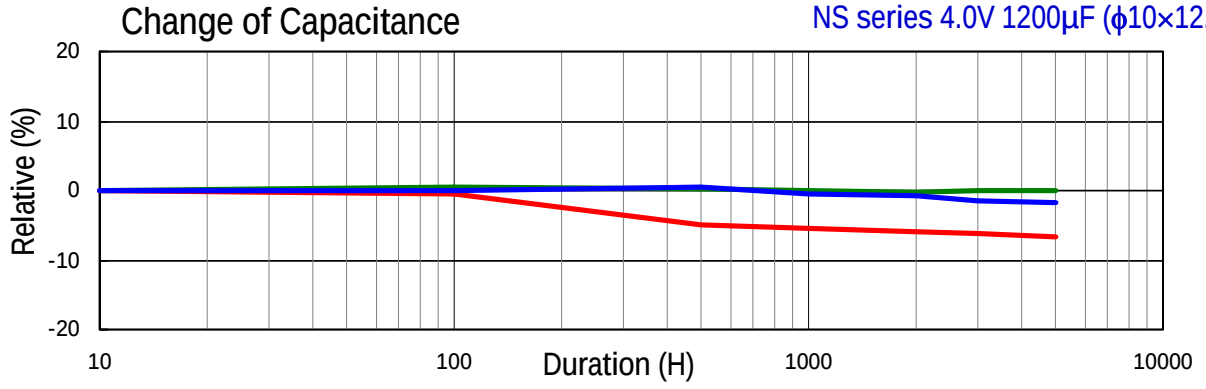
$\Delta Tc = (I^2R) / (\alpha \times \beta \times S)$

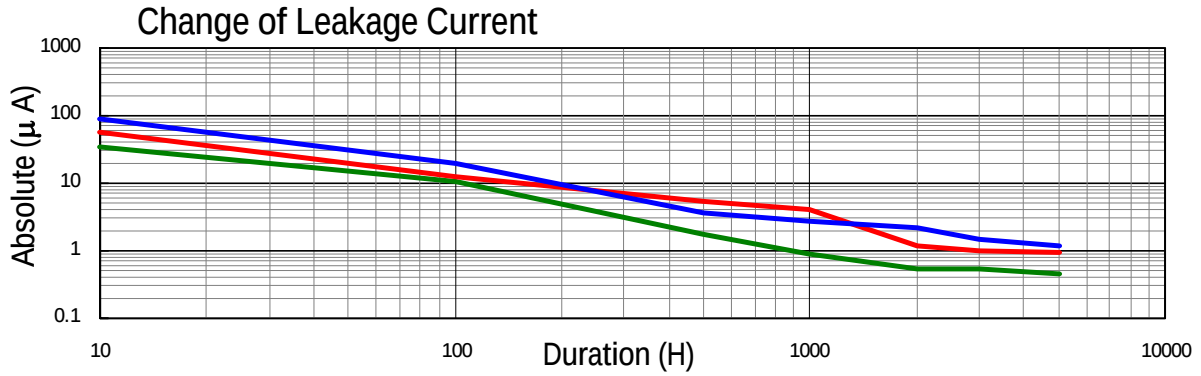
$\log \Delta Tc = \log (I^2R) / (\alpha\beta S)$
$= \log I^2 + \log R - \log \alpha\beta S$
$= 2 \times \log I + (\log R - \log \alpha\beta S)$
$= 2 \times \log I + A$

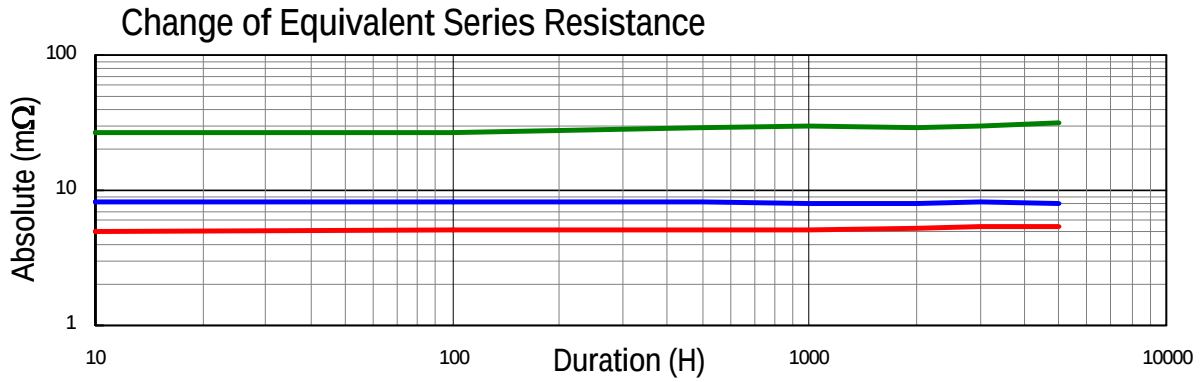
Where,
I : Ripple Current (Arms)
R : ESR (Ω)
ΔT : Fevering Temp. at Outside Wall of Capacitor (°C)
ΔTc : Fevering Temp. at Inside of Capacitor (°C)
β : Heat Radiation coefficient (W/ °C×cm^2)
S : Surface Area of Aluminum Case(cm^2)
α : Ratio of ΔTc/ ΔT

Reliability at 105°C

NS series 6.3V 47µF (ϕ6.3×7L)
L8 series 2.5V 560µF (ϕ 8×8L)
NS series 4.0V 1200µF (ϕ10×12.5L)







Calculation Formula of Lifetime

For FPCAP

In general, calculation formula of lifetime of capacitors is appeared as follows.
The calculation formula of lifetime on FPCAP is same as usual Aluminum capacitor.

$$L_X = L_0 \times 10^{(T_0 - T_X)/20}$$

Where,

L_X (Hrs) =Life expectance in actual use
L_0 (Hrs) =Life time
T_0 (105°C) =Maximum operating temperature (105°C)
T_X (°C) =Temperature of capacitor in actual use

On the other hand, temperature Tx adds the circumference temperature T as the capacitor temperature and the generating temperature ΔT by ripple current.

$$T_X = T + \Delta T$$

T (°C) = Ambient temperature
ΔT (°C) = generating temperature

Furthermore, the generating temperature ΔT by the ripple current is proportional to ripple current, and is shown by the following formula.

$$\Delta T = (I / I_0)^2 \times \Delta T_0$$

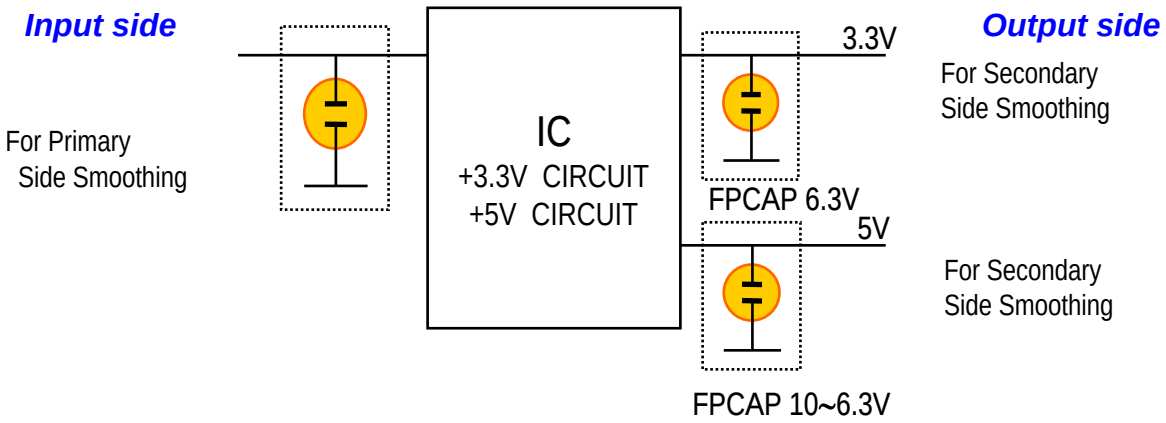
I (A rms) = Ripple current in actual use

I_0 (A rms) = Maximum permissible ripple current

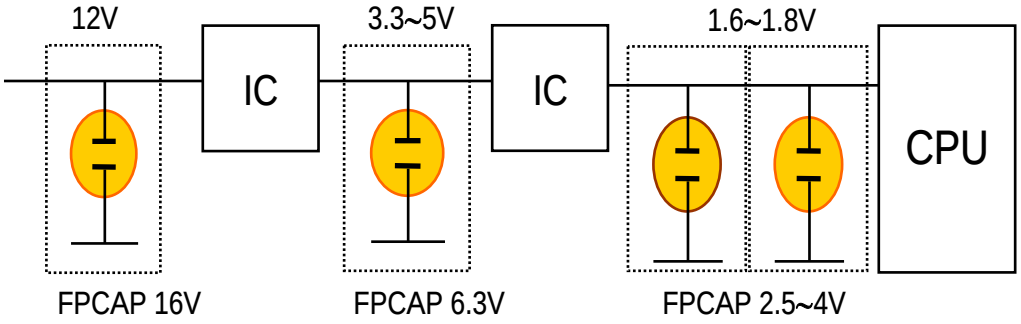
ΔT_0 (°C) = Generated temperature value by maximum permissible ripple current
[About 20 (°C)]

FPCAP Functional Polymer Aluminum Solid Electrolytic Capacitors

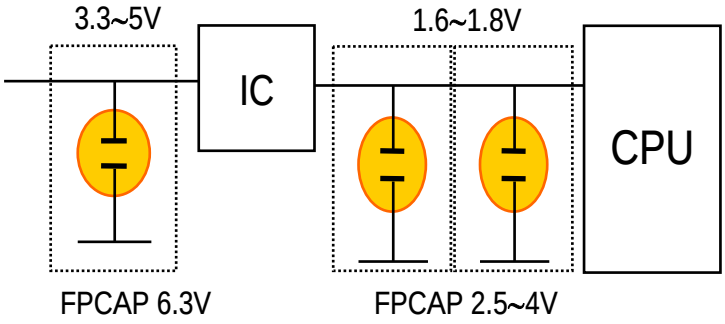
DC/DC Converter Primary, Secondary Side Smoothing



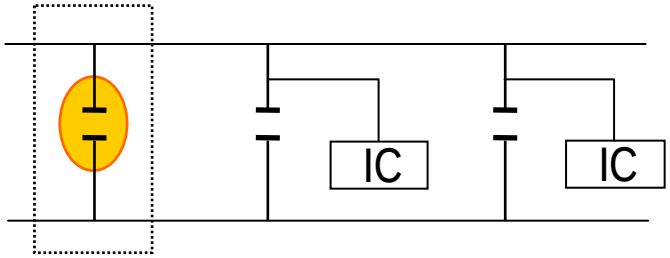
Back-up Capacitor for Variable Load (1)



Back-up Capacitor for Variable Load (2)

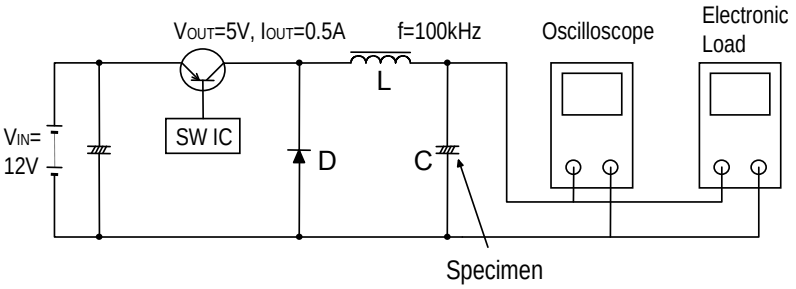


Noise Filters

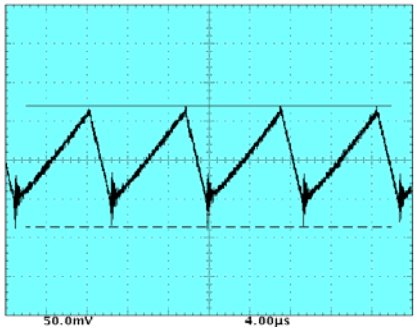


Ripple Removal Capability

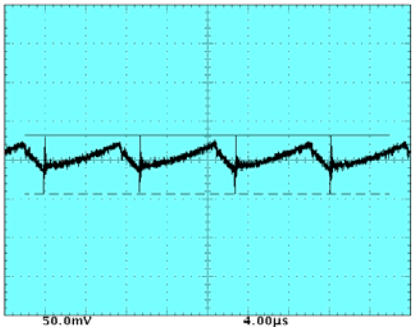
We measured ripple voltage by oscilloscope for output capacitor change on the typical chopper type DC-DC converter. (described below)



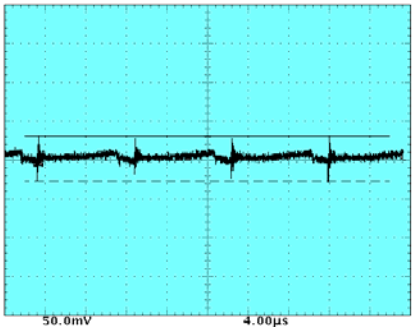
Comparison Between FPCAP and Other Capacitors with Same Capacitance



Low Impedance Aluminum Capacitor
16V100uF (ϕ6.3x11L)
ΔV=156mV



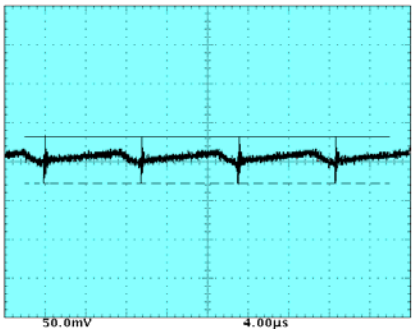
Low ESR Tantalum Capacitor
16V100uF (7.3x4.3x2.9)
ΔV=76mV



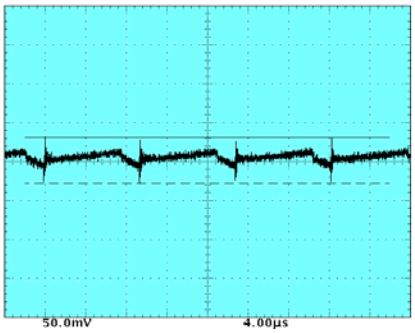
FPCAP
16V100uF (ϕ8x11.5L)
ΔV=58mV

Examination of Same Level Residual Ripple Voltage

To obtain same level of ripple voltage to FPCAP, Low Impedance Aluminum capacitor needs 16V3300uF, even Low ESR tantalum capacitor needs 4 pcs. of same capacitance.



Low Impedance Aluminum Capacitor
16V3300uF (ϕ16x25L)
ΔV=60mV



Low ESR Tantalum Capacitor
16V100uF (7.3x4.3x2.9) X4 pcs.
ΔV=59mV

Spice Model for Simulation Circuits with Computer

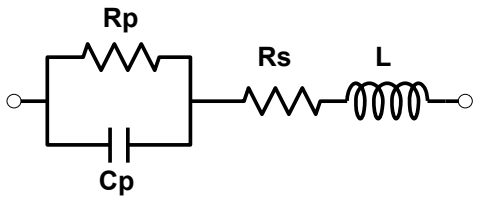
Spice Model of *Radial lead type* (L8 and S8 Series)

Part Number	Cp (μF)	Rs (mΩ)	L (nH)	LC (μA)	Rp (kΩ)
RL80E821MDN1	820	4.2	2.9	100	25
RL80G561MDN1	560	4.2	2.9	100	40
RL80J561MDN1	560	5.0	2.9	100	63
RS80E331MDN1	330	5.3	2.0	30	83
RS80E471MDN1	470	5.3	2.0	50	50
RS80E561MDN1	560	5.3	2.0	100	25

Typical ESL by Case Size

Classification	Case Size (mm)	ESL (nH,40MHz)
Radial lead type	ϕ6.3×8L (S8)	1.8 to 2.2
	ϕ6.3×10L	2.8 to 3.0
	ϕ8×8L (L8)	2.7 to 3.1
	ϕ8×11.5L	3.9 to 4.1
	ϕ8×11.5L (R7)	4.6 to 4.9
	ϕ10×12.5L	5.4 to 5.6
SMD type	ϕ4×5.2L	1.0 to 1.2
	ϕ6.3×5.7L	2.5 to 2.7
	ϕ8×11.7L	3.1 to 3.3
	ϕ10×12.4L	4.5 to 4.7

Equivalent Circuit of Capacitor



Cp : Capacitance
Rp : Equivalent Parallel Resistance
(Insulation resistance) (≅Rated Voltage/LC)
Rs : Equivalent Series Resistance
L : Inductance

$$|Z| = \sqrt{\left\{Rs + \frac{Rp}{\left(1+\omega^2 Cp^2 Rp^2\right)}\right\}^2 + \left\{\omega L - \frac{\omega CpRp^2}{\left(1+\omega^2 Cp^2 Rp^2\right)}\right\}^2}$$

* It is available to present the spice model of other parts for customers.

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http://www.fpcap.jp

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No.4 Xinghua Road, Xiqing Economic Development Zone,
Tianjin, China 300381
TEL.86-22-8396-8930 FAX.86-22-8396-8931

CAUTION
FOR SAFETY

- TO USE NICHICON PRODUCT CORRECTLY AND SAFETY, PLEASE READ "APPLICATION GUIDELINES" VERY CAREFULLY.
- THE PRODUCTS ARE DESIGNED AND MANUFACTURED CHIEFLY FOR GENERAL ELECTRONIC APPLIANCES. IN CASE THAT YOU ARE GOING TO APPLY THEM FOR MEDICAL EQUIPMENT, AIRCRAFT / SPACE EQUIPMENT, OR THE SAME KIND THAT REQUIRES HIGH SAFETY, YOU ARE REQUESTED TO CONFIRM THEIR ADAPTATION BEFORE THE USE.
- 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. ALSO, PLEASE BE SURE TO PERFORM ALL NECESSARY UNIT LEVEL EVALUATION TESTING TO AVOID MALFUNCTIONS THAT COULD BE UNFORESEEABLE DURING COMPONENT LEVEL TESTING ALONE.

NOTE:
- SPECIFICATION AND DIMENSIONS IN THIS CATALOG ARE SUBJECT TO CHANGE WITHOUT NOTICE. IF NECESSARY, DRAWINGS CAN BE PROVIDED.
- IN CASE THAT THERE IS A CERTAIN DANGER OF THE PRODUCTS CONFLICTING WITH THE USE AND ACTIVITY FOR THE DEVELOPMENTS OF WEAPONS OF MASS DESTRUCTION, THE PROCEDURES BASED UPON THE RELEVANT EXPORT REGULATIONLAWS ARE ABSOLUTELY NEEDED.
- THE PRODUCTS AND THEIR PACKAGES DO NOT CONTAIN ANY OZONE DEPLETING SUBSTANCES (ODS) UNDER THE MONTREAL PROTOCOL. AND ODS IN NOT USED IN THEIR MANUFACTURING PROCESSES, TOO.
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