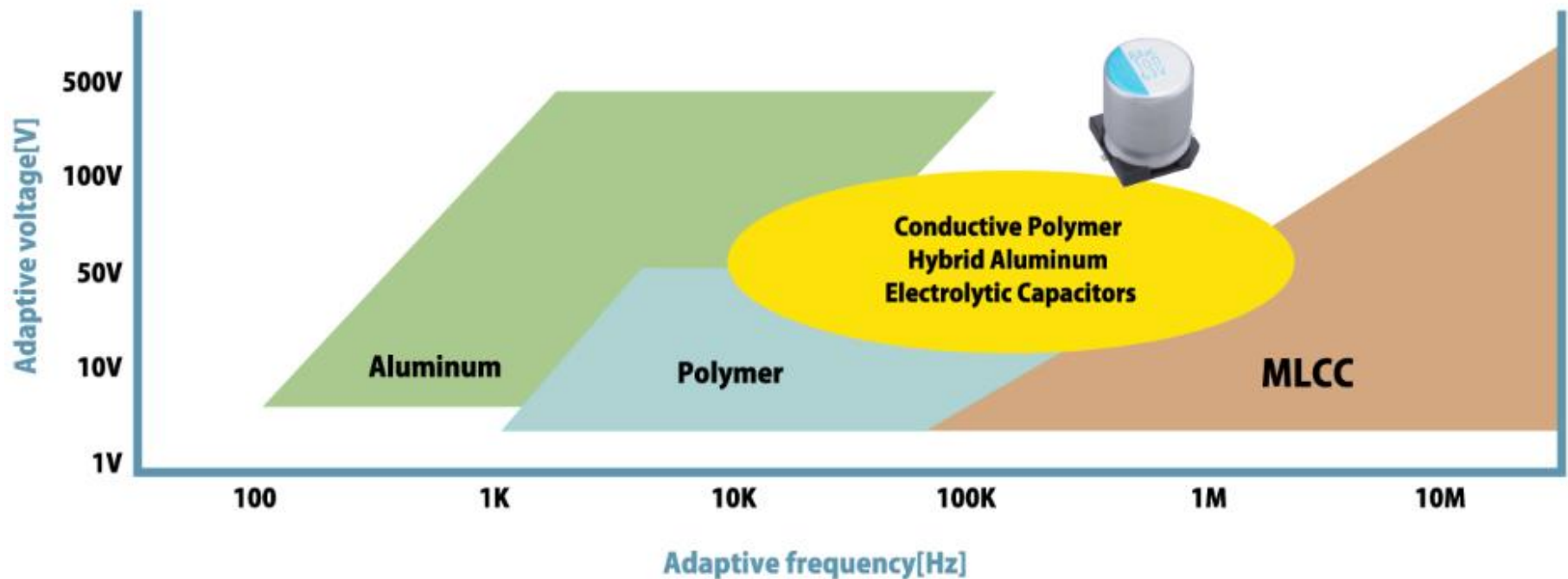


Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Positioning

Realizing a low ESR, long life, and low leak current with a hybrid structure (electrolyte + conductive polymer)

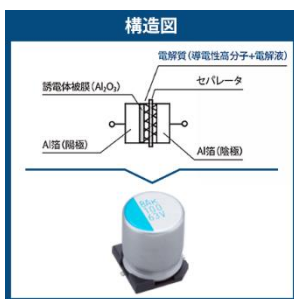
Conductive polymer hybrid aluminum electrolytic capacitors are best-suited for onboard equipment and industrial machinery. Using a conductive polymer and a liquid electrolyte for the solid electrolyte provides both high performance and high reliability, responding to the needs of the customers.



Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

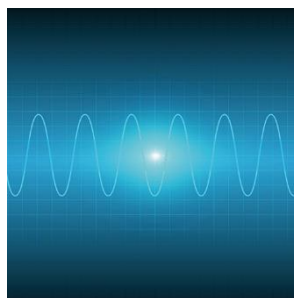
Advantages

Introducing the advantages of conductive polymer hybrid aluminum electrolytic capacitors featuring long life and low ESR.



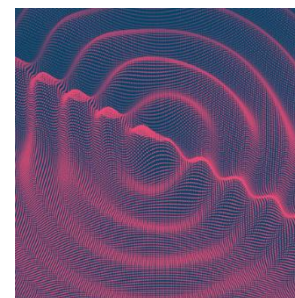
Hybrid Structure

- Conductive polymer + electrolyte
- Long life



Realizing superior properties with a hybrid structure

- Low ESR
- Low leak current
- High ripple



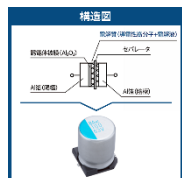
HVK Series
(High-temperature type)

HT/HTK Series
(Vibration-resistant type)

- High temperature ($\leq 150^{\circ}\text{C}$)
- Vibration resistance ($\leq 30\text{ G}$)

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

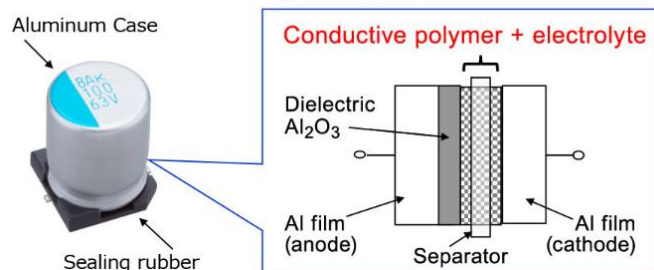
Advantages



Hybrid Structure

Dielectric (alumina) is generated on the surface of the anode film. The anode film and the cathode film sandwich the separator, which is soaked in an electrolyte and conductive polymer. The electrolyte repairs oxygen defects of the alumina by applying a voltage, which provides a longer life compared to a polymer capacitor.

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors



1. Low ESR similar to conductive polymer capacitors
2. Low leak current similar to aluminum electrolytic capacitors

Technology Comparison of Aluminum, Polymer and Hybrid

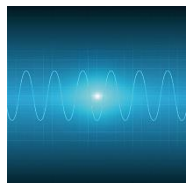
Comparison of 35v, 105C same size D10

Item	Conductive polymer Hybrid Aluminum Electrolytic Capacitors	Conductive Polymer Capacitors	Aluminum Electrolytic Capacitors
ELNA series	HV	PVS	RVV
Solid electrolyte	Conductive polymer + electrolyte	Conductive polymer	Liquid electrolyte
ESR @ 20°C 100kHz	<i>Excellent</i>	<i>Good</i>	<i>Average</i>
Leak current	<i>Excellent</i>	<i>Average</i>	<i>Good</i>
Rated ripple current	<i>Good</i>	<i>Excellent</i>	<i>Average</i>
High-freq. char @ low temp.	<i>Excellent</i>	<i>Excellent</i>	<i>Average</i>
Guaranteed life	<i>Excellent</i>	<i>Average</i>	<i>Average</i>

TAIYO YUDEN

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Advantages

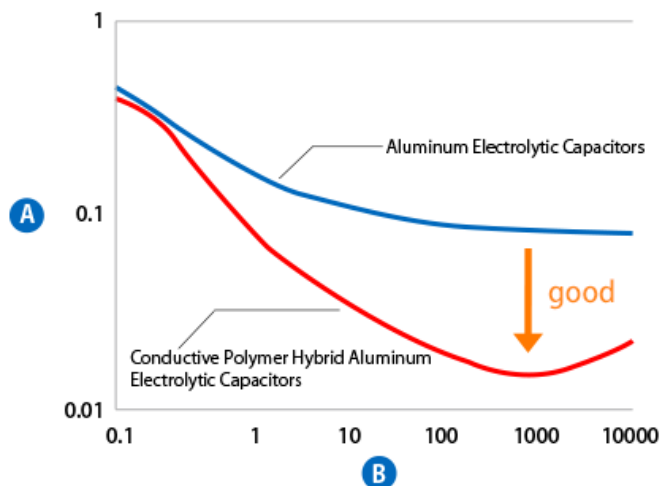


Low ESR and stable temperature characteristics

Hybrid aluminum electrolytic capacitors use conductive polymer, which provides lower ESR compared to aluminum electrolytic capacitors, and stable ESR characteristics from low to high temperatures. Can be replaced with smaller hybrid aluminum electrolytic capacitors.

Low ESR

Frequency characteristics of ESR (at 20°C)
Compared to aluminum electrolytic capacitors, hybrid aluminum electrolytic capacitors have lower ESR characteristics.

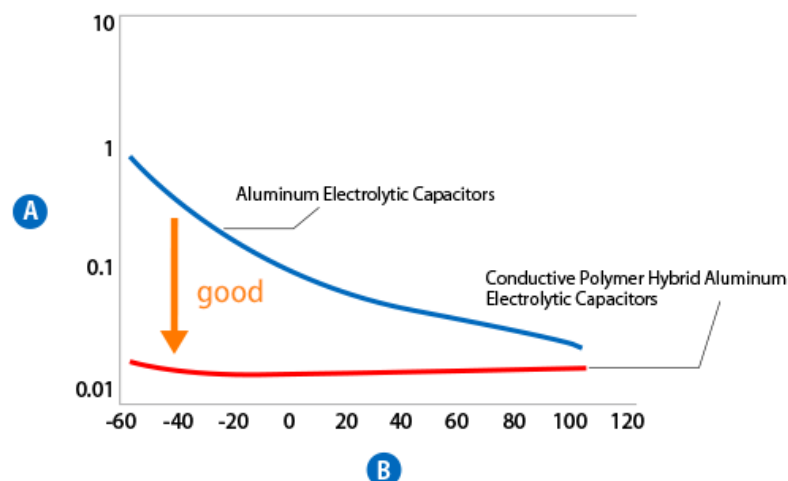


A ESR (Ohm) at 20°C

B Frequency (kHz)

Stable temperature characteristics

Temperature characteristics of ESR (at 100 kHz)
The ESR of an aluminum electrolytic capacitor rises significantly in the low-temperature area. On the other hand, a hybrid aluminum electrolytic capacitor has stable ESR characteristics from low to high temperatures.



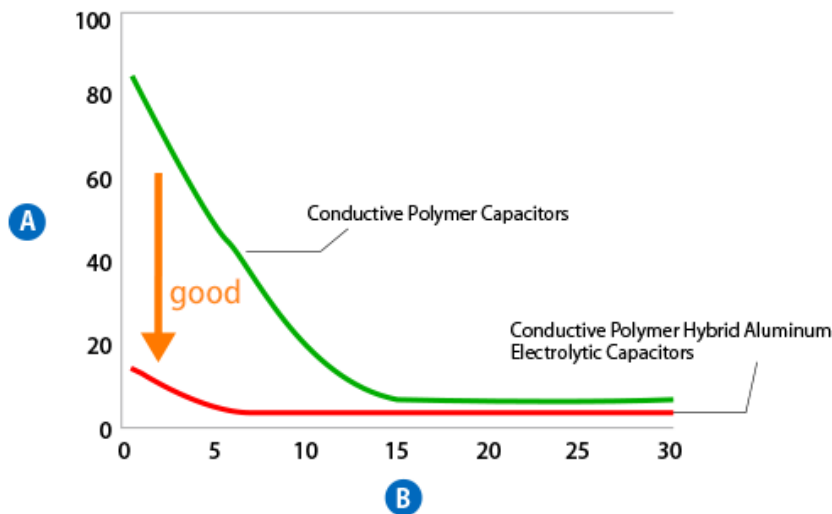
A ESR (Ohm) at 100kHz

B Temperature (°C)

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

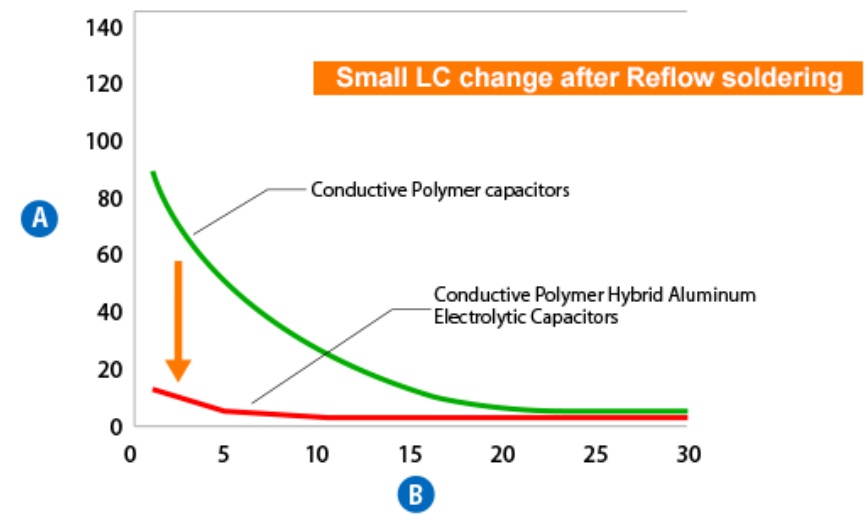
Advantages

Low leak current



A Leakage current (uA)

B Time (min.)



A Leakage current (uA)

B Time (min.)