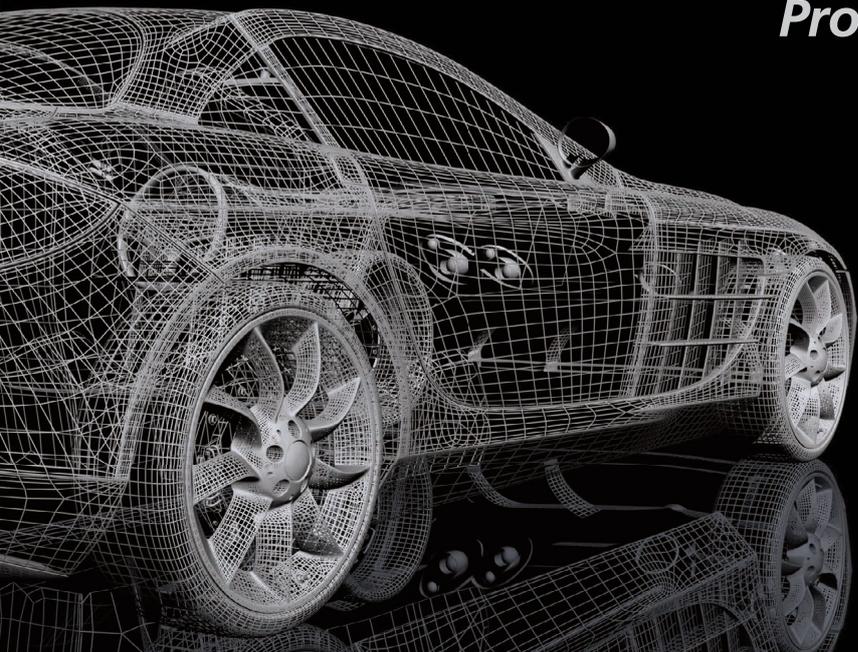


TAIYO YUDEN

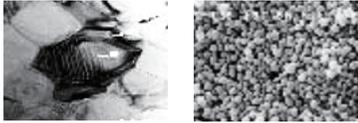
Products for Automotive



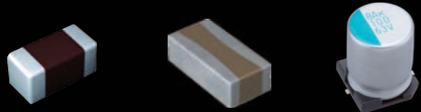
High-reliability Parts

In order to meet the high demands of the automotive electronics market and the industrial equipment market, we have introduced a new high quality category in our lineup of electronic parts, including multilayer ceramic capacitors, inductors, and noise suppression components.

Taiyo Yuden's High-reliability Parts

Optimal Materials	Optimal Design	Follow Automotive Standards
	<p style="text-align: center;">Automotive</p> <p>Long life Low failure rate</p> <p style="text-align: center;">Industrial</p> <p>Compact High capacity</p>	<p style="text-align: center;">AEC-Q200</p> <p style="text-align: center;">IATF16949</p>

Capacitors



Multilayer ceramic capacitors

Conductive polymer hybrid aluminum electrolytic capacitors

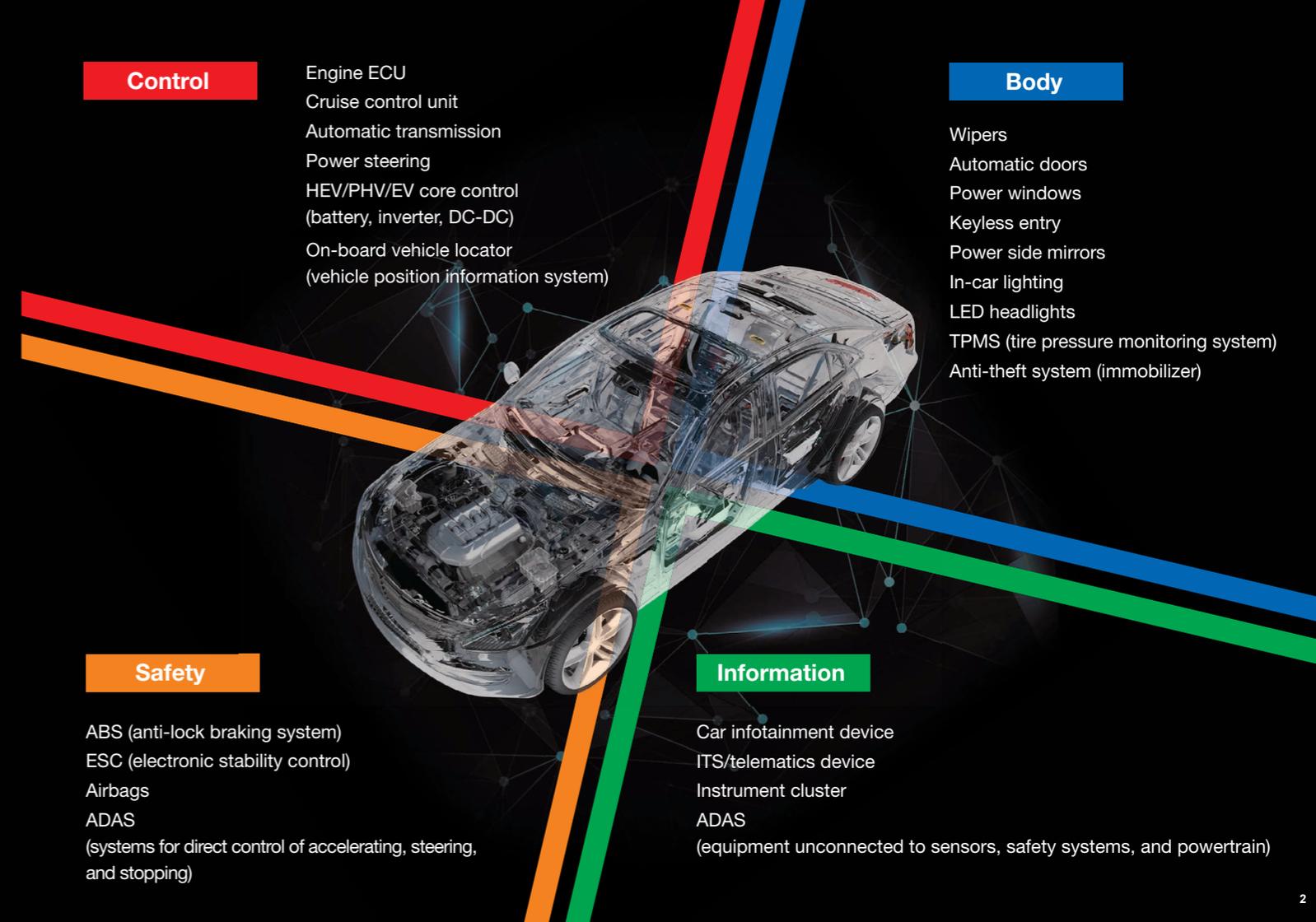
Inductors and EMC Suppression Components

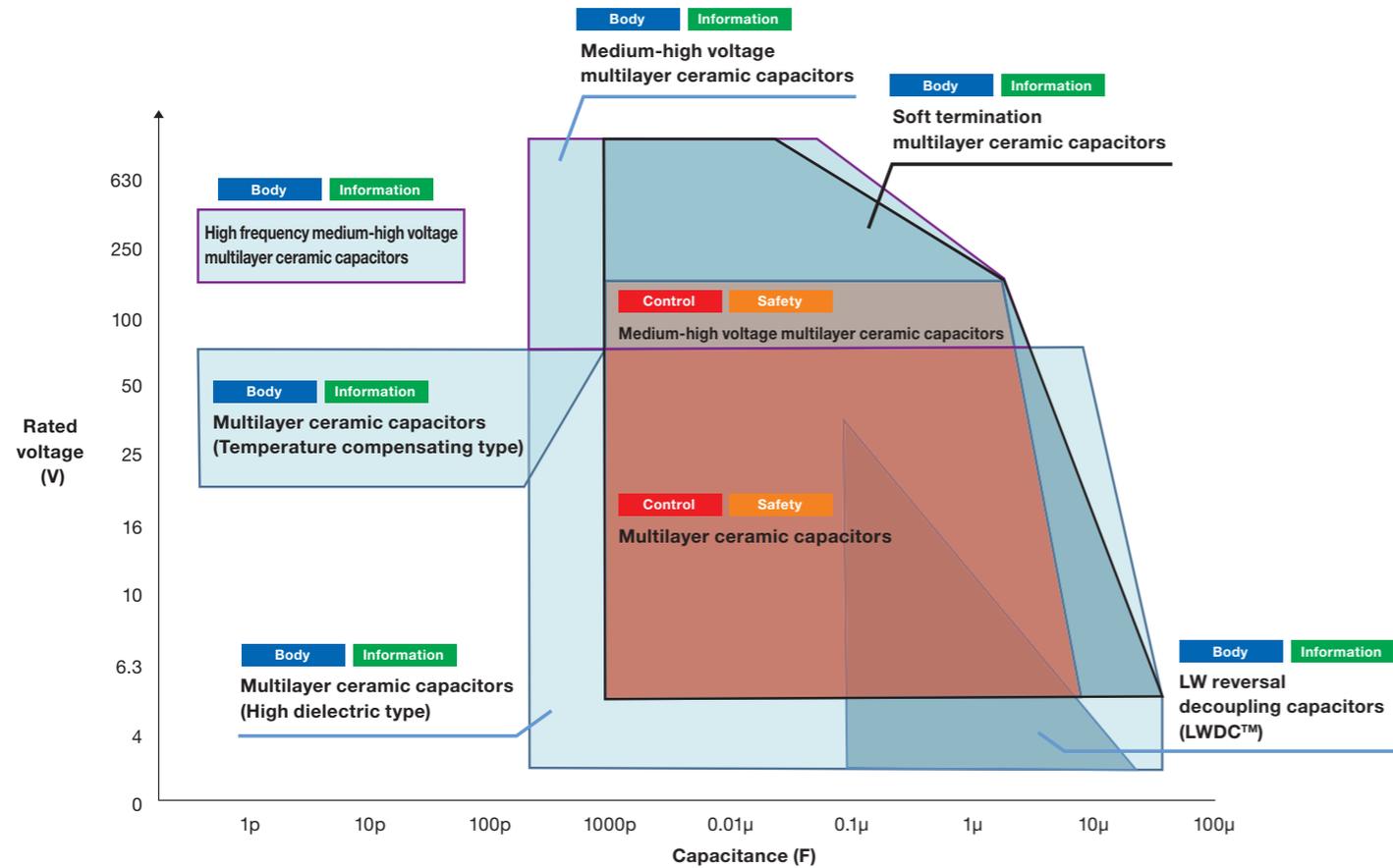


Metal power inductors

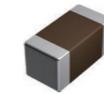
Ferrite power inductors

Bead inductors





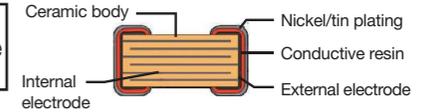
Soft Termination Multilayer Ceramic Capacitors



Characteristics

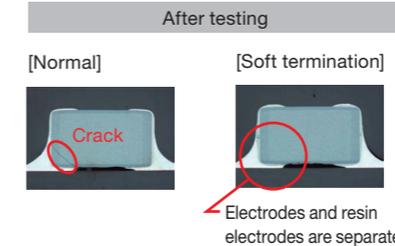
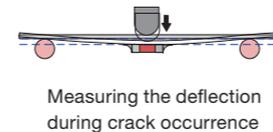
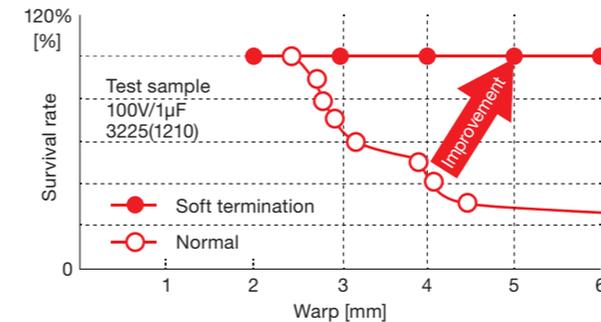
The external electrode includes a conductive resin. The resin layer reduces stress from board flex, preventing parts from breaking, as well as reducing solder degradation from thermal shock by absorbing the difference in the thermal expansion rates of the circuit board and components through the resin layer's flexibility.
Applications: ECU, headlight control circuits

Structure



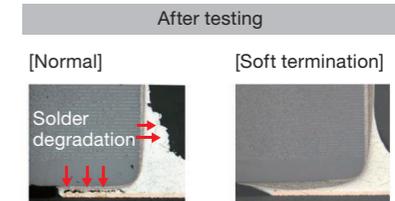
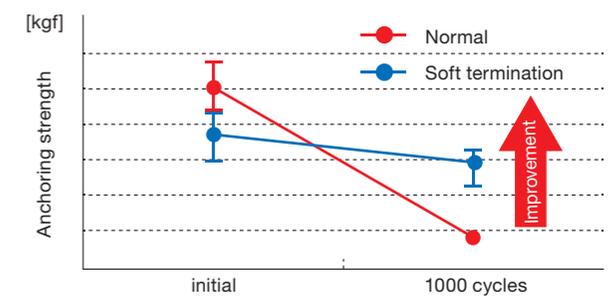
Suppressing cracks caused by circuit board deflection

[Board Flex Endurance]



Suppressing solder degradation caused by thermal shock

[Temperature Cycling Endurance]

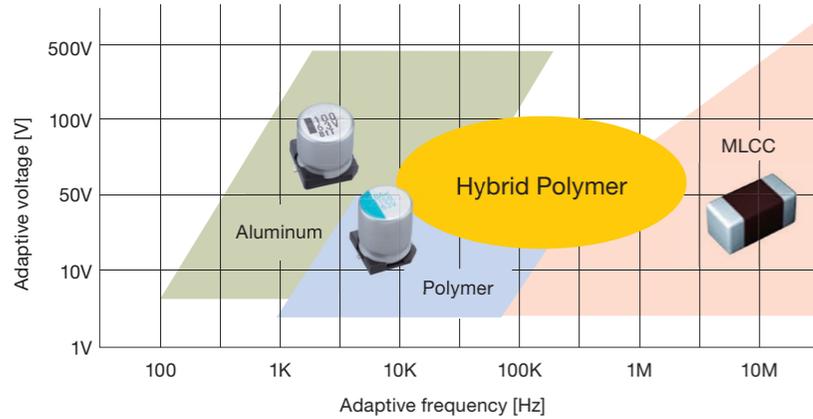


Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

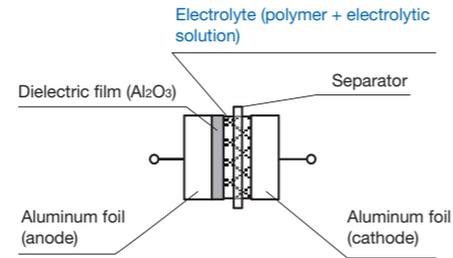
Control Safety Body Information

Enabling electrolyte with low ESR, high withstand voltage, and long life through hybrid technology that utilizes solid conductive polymers and electrolytic solution.

Capacitor map



Hybrid aluminum electrolytic structure



Advantages

Product	Aluminum	Polymer	Hybrid Polymer
Electrolytes	Electrolytic solution	Polymer	Polymer + electrolytic solution
ESR (at 20°C 100kHz)	70mΩ	30mΩ	20mΩ
Leakage current (uA)	0.01CV	0.5CV	0.01CV
	115	1750	94
Rated ripple current (mA rms)	1190	3500	2500
High frequency characteristics at low temperatures	No good	Good	Good
Guaranteed lifetime	105°C 2000 hours	105°C 2000 hours	105°C 5000hours

Vibration Resistant Type

Control Safety Body Information

Vibration resistance	Leaded	Chip type	
	Aluminum electrolytic	Aluminum electrolytic	Conductive polymer hybrid aluminum electrolytic
30G	RPK (125°C)	RTZ (105°C) RTD (105°C)	HT (105°C) HTK (125°C)
		RTT (125°C) RTQ (150°C)	HTX (135°C)
40G	RKF (135°C)	-	-

Leaded

Chip type

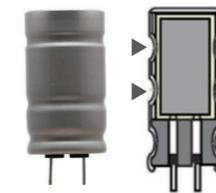
RPK Series

RKF Series

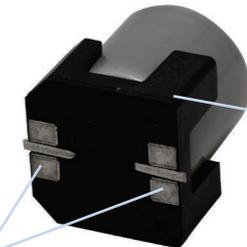


Sub terminal (No Contact)

Auxiliary terminal --> Increased adhesive strength

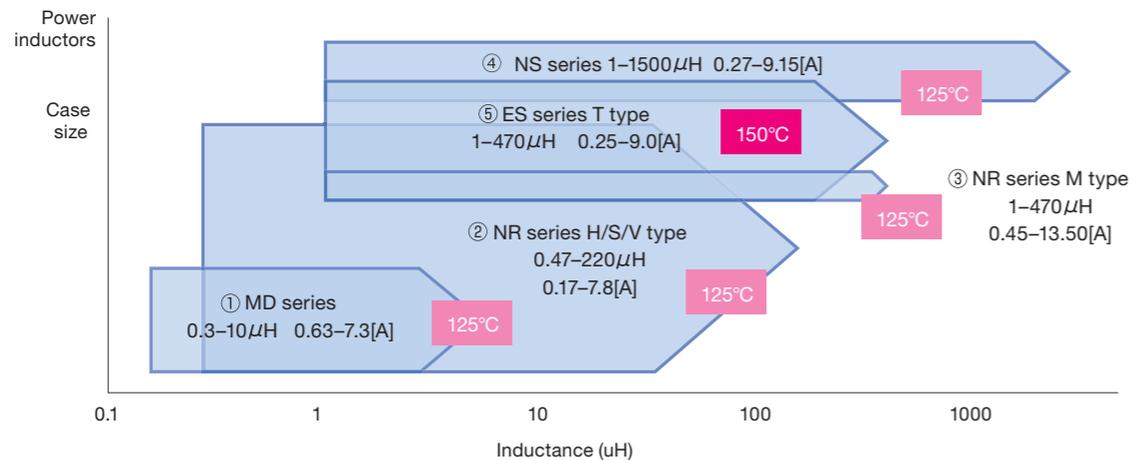


Internal component
Vibration prevention

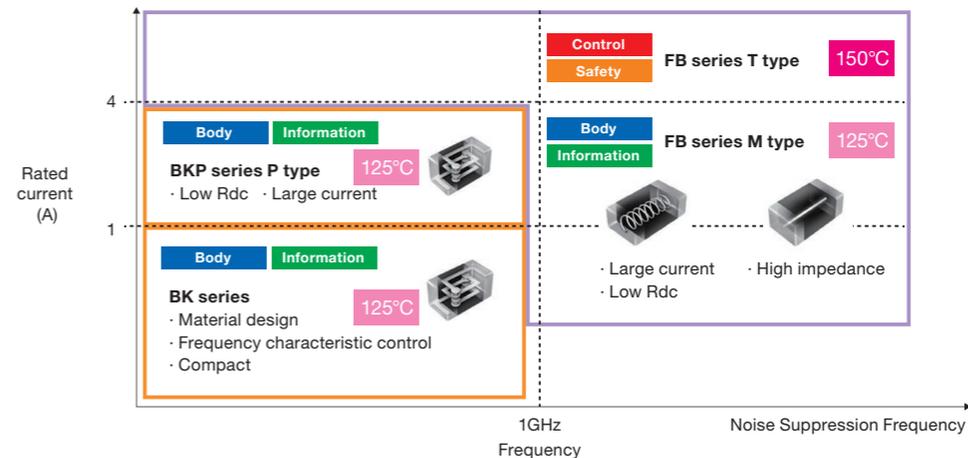


High-walled stand --> Fixed body

Auxiliary terminal --> Increased adhesive strength

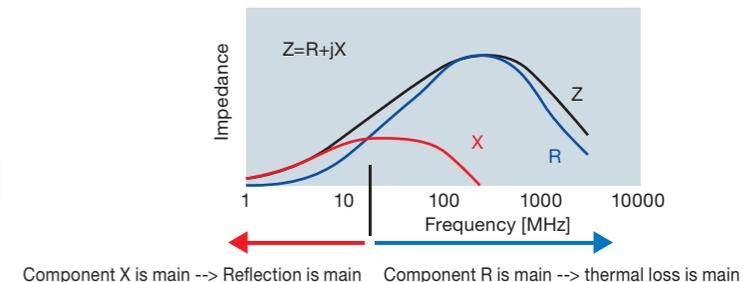
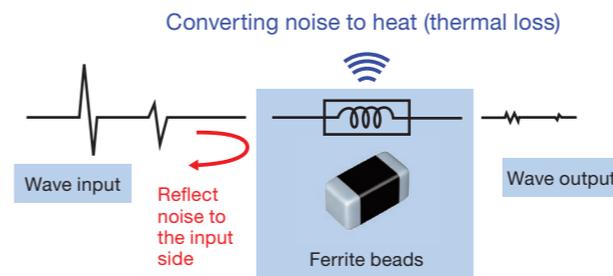


Ferrite Bead Inductors



Type	Metal power inductors	Ferrite power inductors				Standard inductors	High frequency inductors
Series	① MD series	② NR series H type/S type/V type	③ NR series M type	④ NS series	⑤ ES series T type	LK series	HK series
	Body Information	Body Information	Body Information	Body Information	Control Safety	Body Information	Body Information
External appearance							
Internal structure	Metal drum core Coil, Metal Resin, Electrode	Ferrite drum core Coil, Ferrite Resin, Electrode	Ferrite drum core Coil, Metal Resin, Electrode	Ferrite sleeve core, Ferrite drum core Coil, Electrode	Ferrite sleeve core, Ferrite drum core Coil, Electrode	Ferrite Electrode, Coil pattern	Ceramic Electrode, Coil pattern

Application of Ferrite Beads





Energy Devices

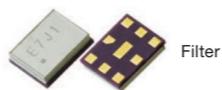
Information

	Taiyo Yuden electric double-layer capacitor EDLC	Taiyo Yuden lithium ion capacitor LITHOSION™	Competitors' lithium ion batteries LIB
Internal resistance	⊙ Low	⊙ Medium	△ High
Voltage temperature range	2.7-0V -40-70°C	3.5-2.5V -30-85°C	3.8-2.2V -30-70°C
Capacity ÷ Volume	△ 1	⊙ 2 to 3	⊙ 100
Discharge/charge cycles	⊙ 100K+ Cycles	⊙ 10K+ Cycles	△ 500-1K Cycles
Self-discharge	△	⊙	⊙
Safety	⊙	⊙	△
Necessity of voltage monitoring	Not required	Required	Required

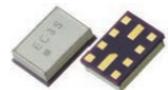
* LITHOSION™ is a trademark and brand of TAIYO YUDEN CO., LTD.

FBAR/SAW Devices & Multiplexers

Information



Filter



Duplexer/Quadplexer

Multilayer Ceramic Devices

Information



Multiplexer



Band Pass Filter



Dual Low Pass Filter



Coupler



Low/High Pass Filter



Antenna

Wireless Modules

Information

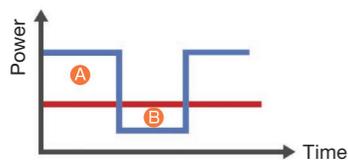


Bluetooth® low energy

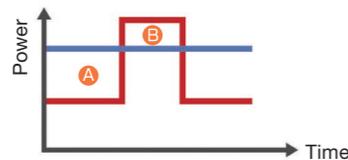


WLAN: 802.11 CPU Embedded

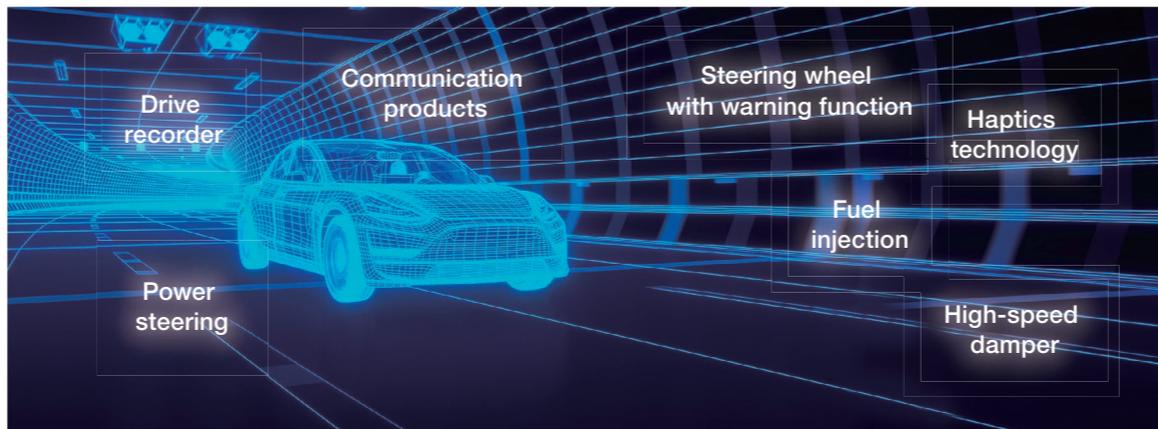
Backup power application



Peak assist application



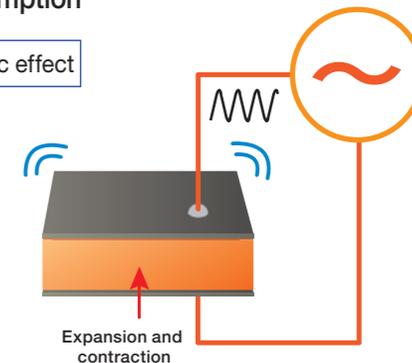
— Power provided by main power supply — Power required by the load
 A Surplus power charged to the capacitor B Required power discharged from the capacitor



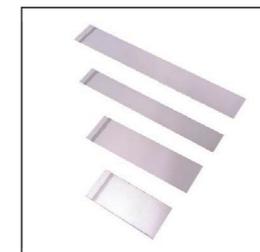
Functional element with high displacement function and low power consumption

Body Information

Inverse piezoelectric effect

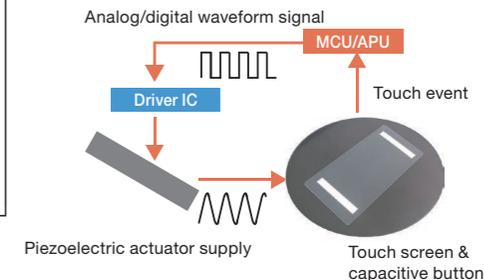


Optimal shape suggestions



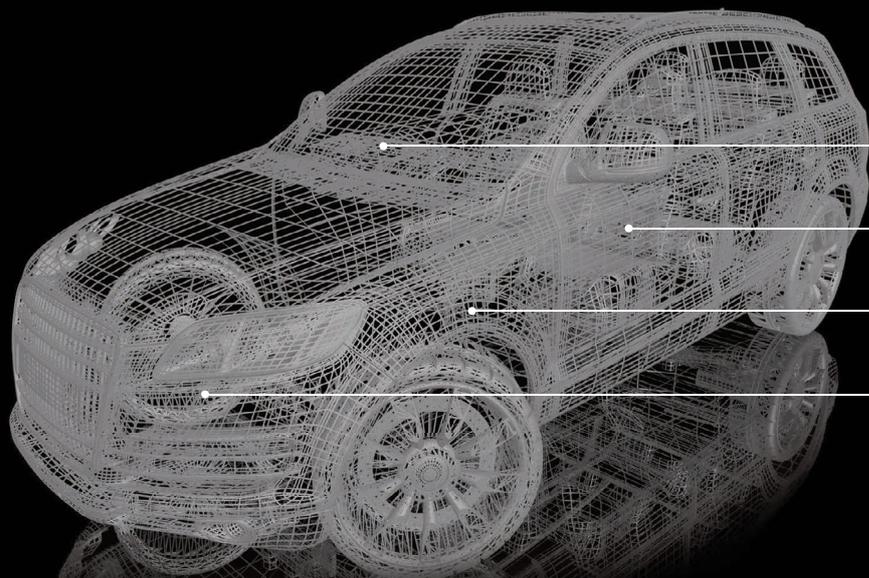
Optimal implementation suggestions

Piezoelectric actuator business model



TAIYO YUDEN

<https://www.yuden.co.jp/ut/>



Infotainment

Body & Chassis

Safety

Powertrain