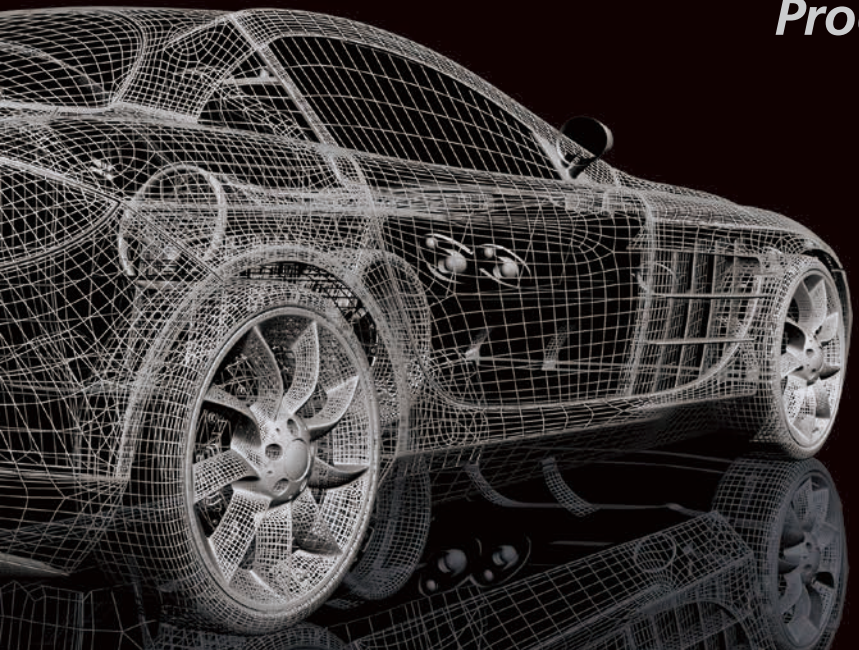
TAIYO YUDEN



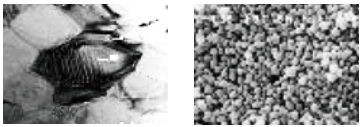
Products for Automotive

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

Automotive

Long life | Low failure rate

Industrial

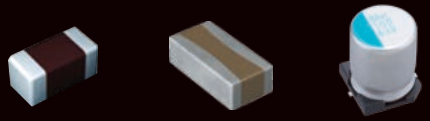
Compact | High capacity

Follow Automotive Standards

AEC-Q200

IATF16949

Capacitors



Multilayer ceramic capacitors

Conductive polymer hybrid aluminum electrolytic capacitors

Inductors and EMC Suppression Components

Metal power inductors

Ferrite power inductors

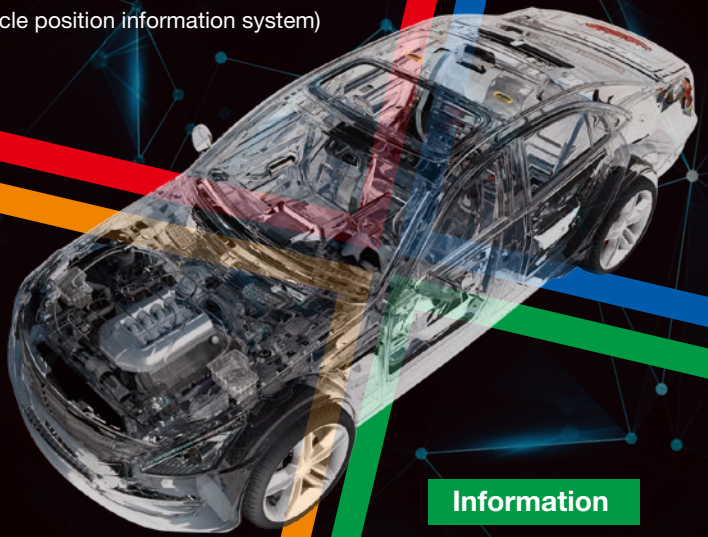
Bead inductors

Control

Engine ECU
Cruise control unit
Automatic transmission
Power steering
HEV/PHV/EV core control
(battery, inverter, DC-DC)
On-board vehicle locator
(vehicle position information system)

Body

Wipers
Automatic doors
Power windows
Keyless entry
Power side mirrors
In-car lighting
LED headlights
TPMS (tire pressure monitoring system)
Anti-theft system (immobilizer)



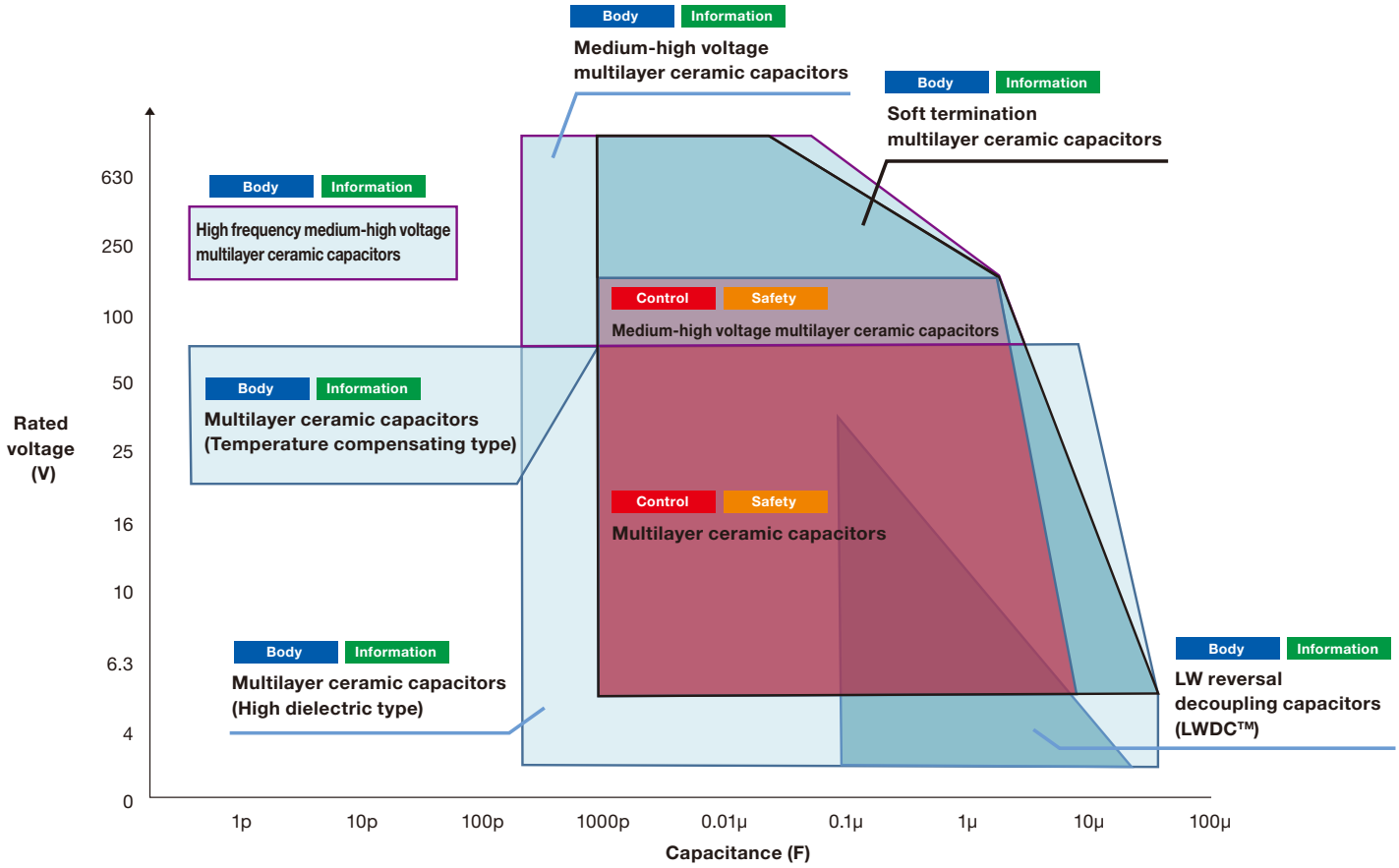
Safety

ABS (anti-lock braking system)
ESC (electronic stability control)
Airbags
ADAS
(systems for direct control of accelerating, steering, and stopping)

Information

Car infotainment device
ITS/telematics device
Instrument cluster
ADAS
(equipment unconnected to sensors, safety systems, and powertrain)

Multilayer Ceramic Capacitors



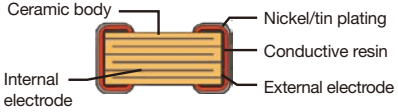
Soft Termination Multilayer Ceramic Capacitors

Body | Information

Characteristics

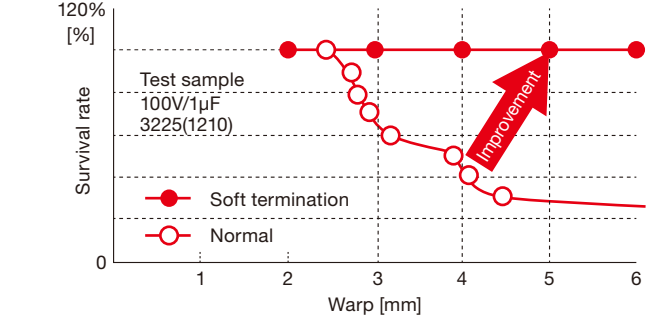
The external electrode includes a conductive resin. The resin layer reduces stress from board flex, preventing parts from breaking, as well as reducing solder degradation from thermal shock by absorbing the difference in the thermal expansion rates of the circuit board and components though the resin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

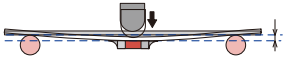
Structure



Suppressing cracks caused by circuit board deflection

[Board Flex Endurance]





Measuring the deflection during crack occurrence

After testing

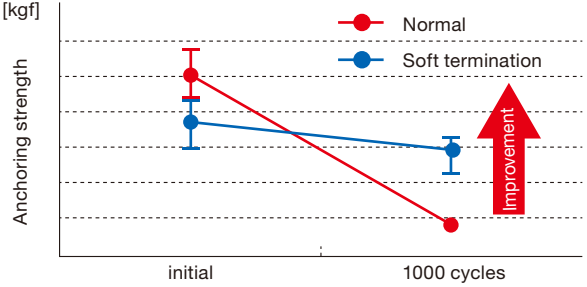
[Normal]

[Soft termination]

Electrodes and resin electrodes are separated

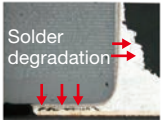
Suppressing solder degradation caused by thermal shock

[Temperature Cycling Endurance]

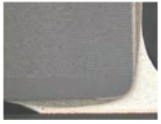


After testing

[Normal]



[Soft termination]

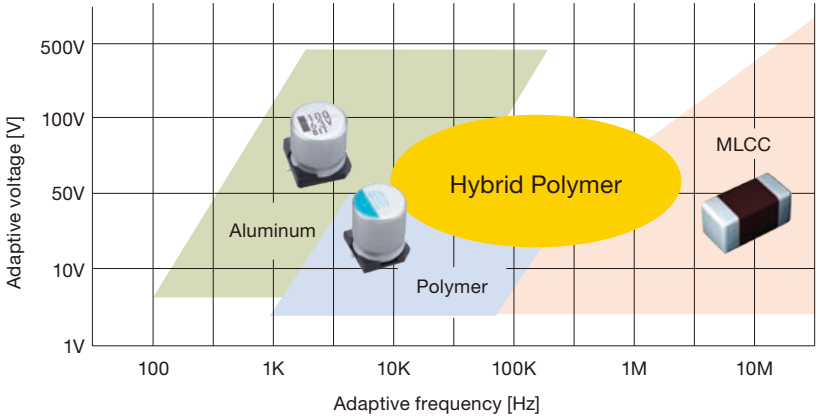


Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

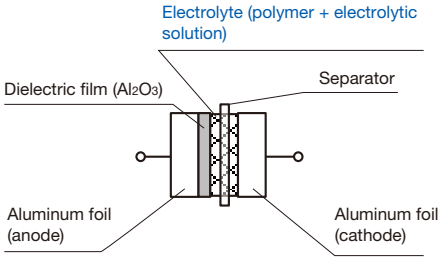
Control | Safety | Body | Information

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 115	0.5CV 1750	0.01CV 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)	–	–

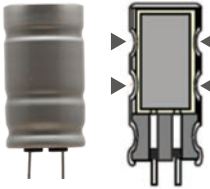
Leaded

RPK Series

Sub terminal
(No Contact)

Auxiliary terminal -->
Increased adhesive strength

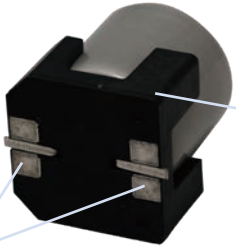
RKF Series



Internal component

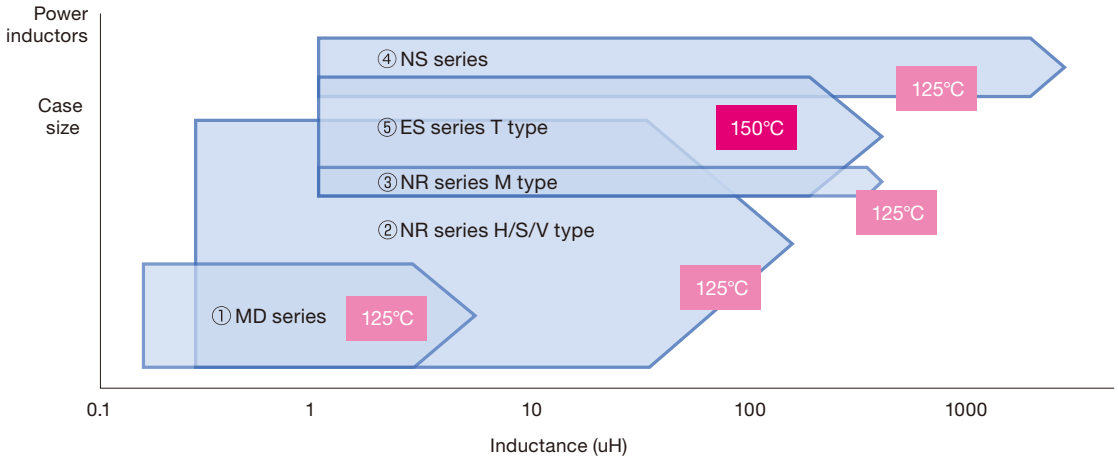
Vibration prevention

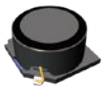
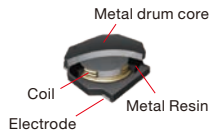
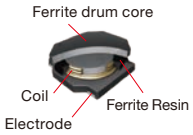
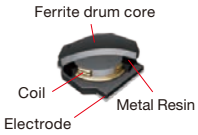
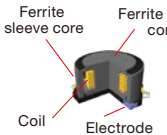
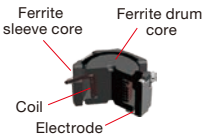
Chip type



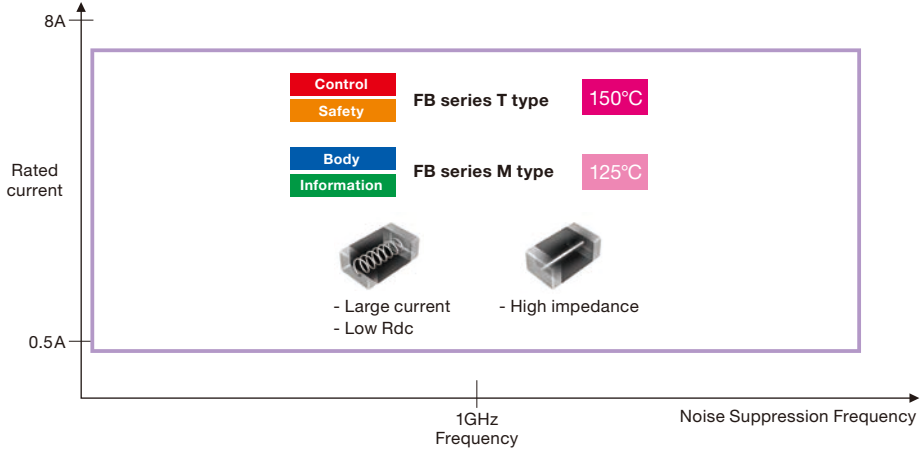
High-walled stand
--> Fixed body

Auxiliary terminal -->
Increased adhesive strength

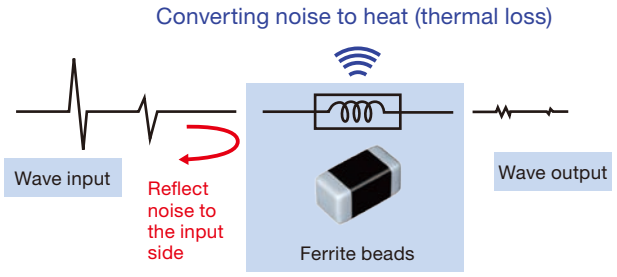


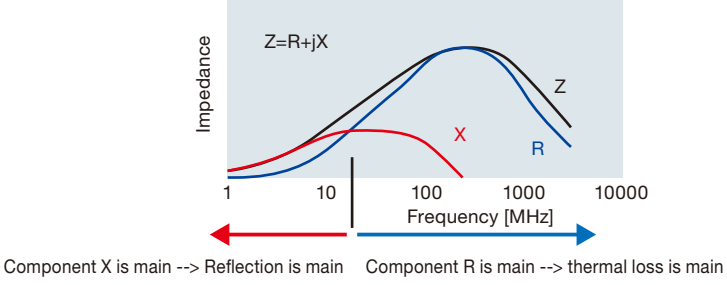
Type	Metal power inductors	Ferrite power inductors			
Series	① MD series	② NR series H type/ S type/V type	③ NR series M type	④ NS series	⑤ ES series T type
	Body Information	Body Information	Body Information	Body Information	Control Safety
External appearance					
Internal structure					

Ferrite Bead Inductors



Application of Ferrite Beads





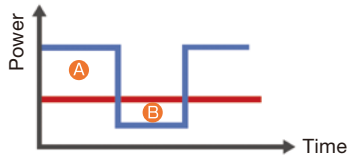
Power Storage Devices

Information

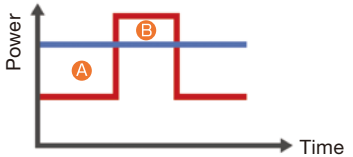
	Taiyo Yuden electric double-layer capacitor EDLC	Taiyo Yuden lithium ion capacitor LITHOSION™	Competitors' lithium ion batteries LIB
Internal resistance	◎ Low	○ Medium	△ High
Voltage temperature range	2.7–0V -40–70°C 2.3–0V -40–85°C	3.5–2.5V -30–85°C 3.8–2.2V -30–70°C	to 4.3V -20–60°C
Capacity ÷ Volume	△ 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.

Backup power application



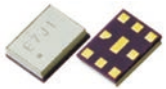
Peak assist application



Power provided by main power supply — Power required by the load

Ⓐ Surplus power charged to the capacitor Ⓑ Required power discharged from the capacitor

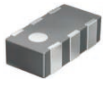
FBAR/SAW Devices & Multiplexers



Filter

Multilayer Ceramic Devices

Multiplexer

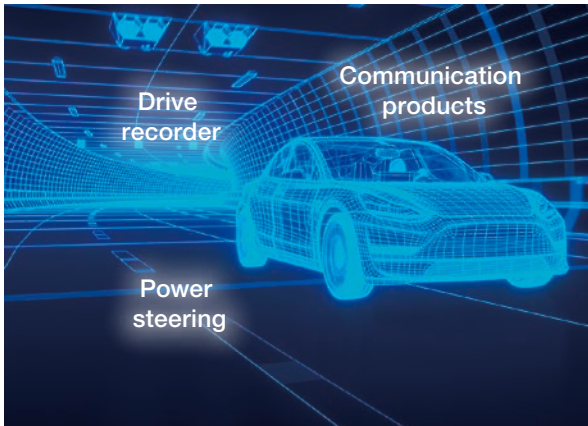


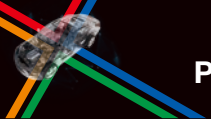
Band Pass Filter

Dual Low Pass Filter

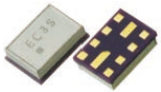
Wireless Modules

Bluetooth® low energy





Information



Duplexer/Quadplexer

Information

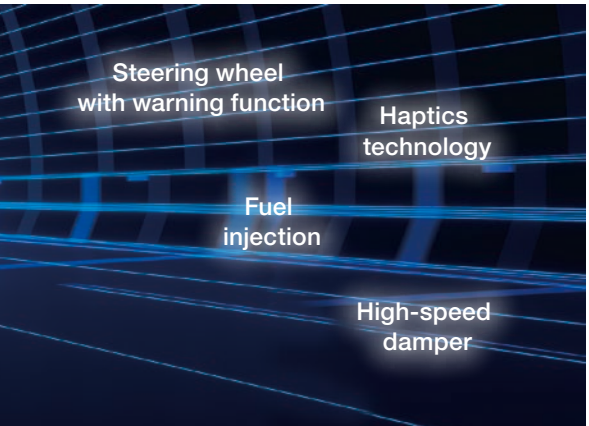
Coupler

Low/High Pass Filter

Antenna

Information

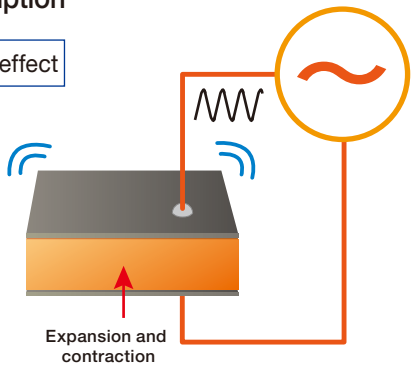
WLAN: 802.11 CPU Embedded



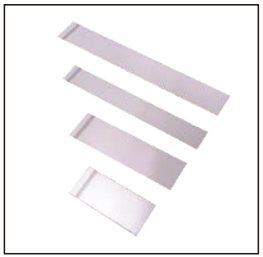
Functional element with high displacement function and low power consumption

Body Information

Inverse piezoelectric effect

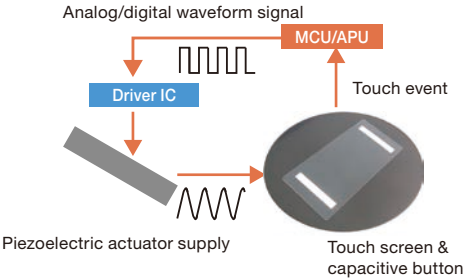


Optimal shape suggestions



Optimal implementation suggestions

Piezoelectric actuator business model



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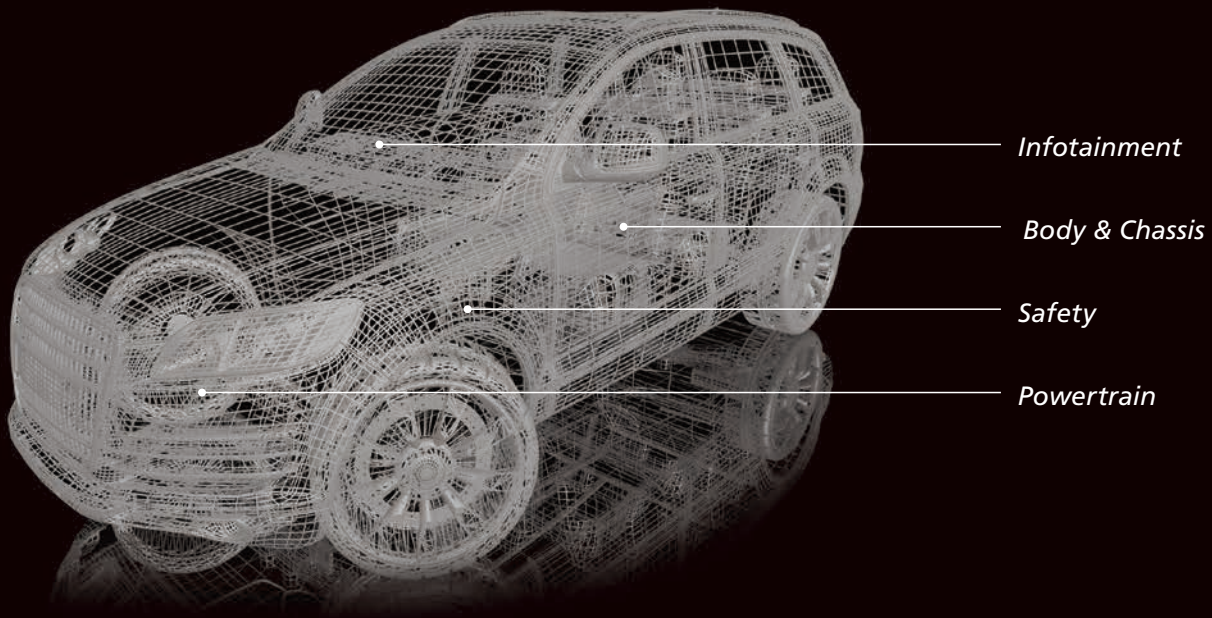
https://www.yuden.co.jp/ut/



C20D