



艾华集团汽车级铝电容解决方案

AiSHi
THINK AHEAD

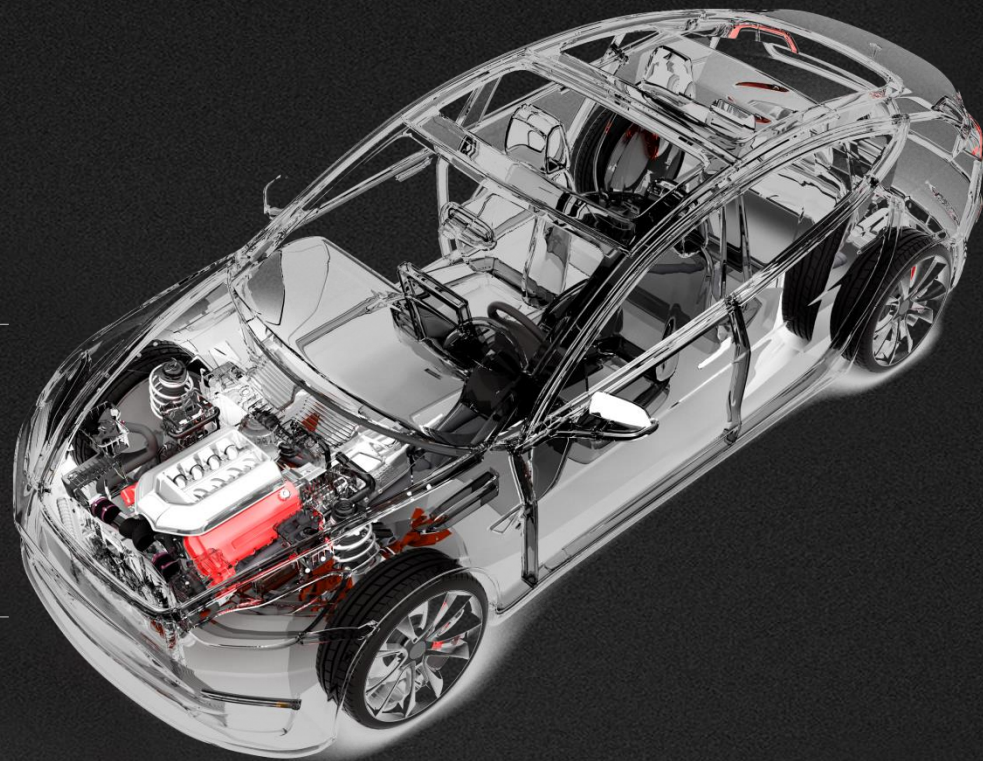
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02 汽车事业部市场推广战略

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01 汽车事业部简介

艾华愿景

愿景：建百年企业，创幸福艾华！

湖南艾华集团股份有限公司成立于1985年，以设计、制造及销售铝电解电容器为核心，集电极箔与设备制造于一体的制造型企业集团，工厂分布于湖南、四川、江苏、新疆，在职员工4600+人。

37
years
since 1985

发展历程

•益阳资江电子
元件厂

•绵阳(高新区)资
江电子元件有限
公司

•获取ISO9001

•四川艾华电子
有限公司成立

•获取ISO14001

•四川雅安艾华
电极箔制造有限
公司

•引进日本先进
技术

•获取
OHSAS18001

•江苏立富电极
箔有限公司

•AISHI被评为
湖南名牌

•获取IEC
QC080000

•搬迁至艾华工
业园

•益阳艾华富贤
电子有限公司
投产

•获取 ISO/TS
16949

•江苏立富电极箔
有限公司与川竹
合资

•上海证券交易所
上市 股票代码:
603989

•新疆荣泽铝箔制
造有限公司

•固态叠层产品
投产

•IATF16949:2016
&ISO9001:2015
认证

•艾华新动力电容
(苏州) 有限公司

•获得ISO 17025
& CNAS 认证实
验室

•36, 000平米智
慧工厂建成

1985 1996 2002 2003 2005 2010 2013 2015 2016 2018 2021

汽车电子事业部架构



艾华工业园布局

一期三栋厂房

- 2F 汽车电子事业部 (固液混合)
- 2F 工控事业部 (牛角螺栓)
- 1F 固态/叠层

星级餐厅

二期仓库 立体仓库

艾华二期新厂房

- 3F 汽车电子事业部 (纯液态贴片/纯液态牛角)
- 2F 消费电子事业部 (纯液态引线大壳号)
- 1F 工控事业部 (纯液态牛角产品)

一期二栋厂房 消费电子事业部
(低压纯液态)

一期一栋厂房 消费电源事业部
(高压纯液态)

一期办公大楼 行政办公大楼



总占地面积216亩

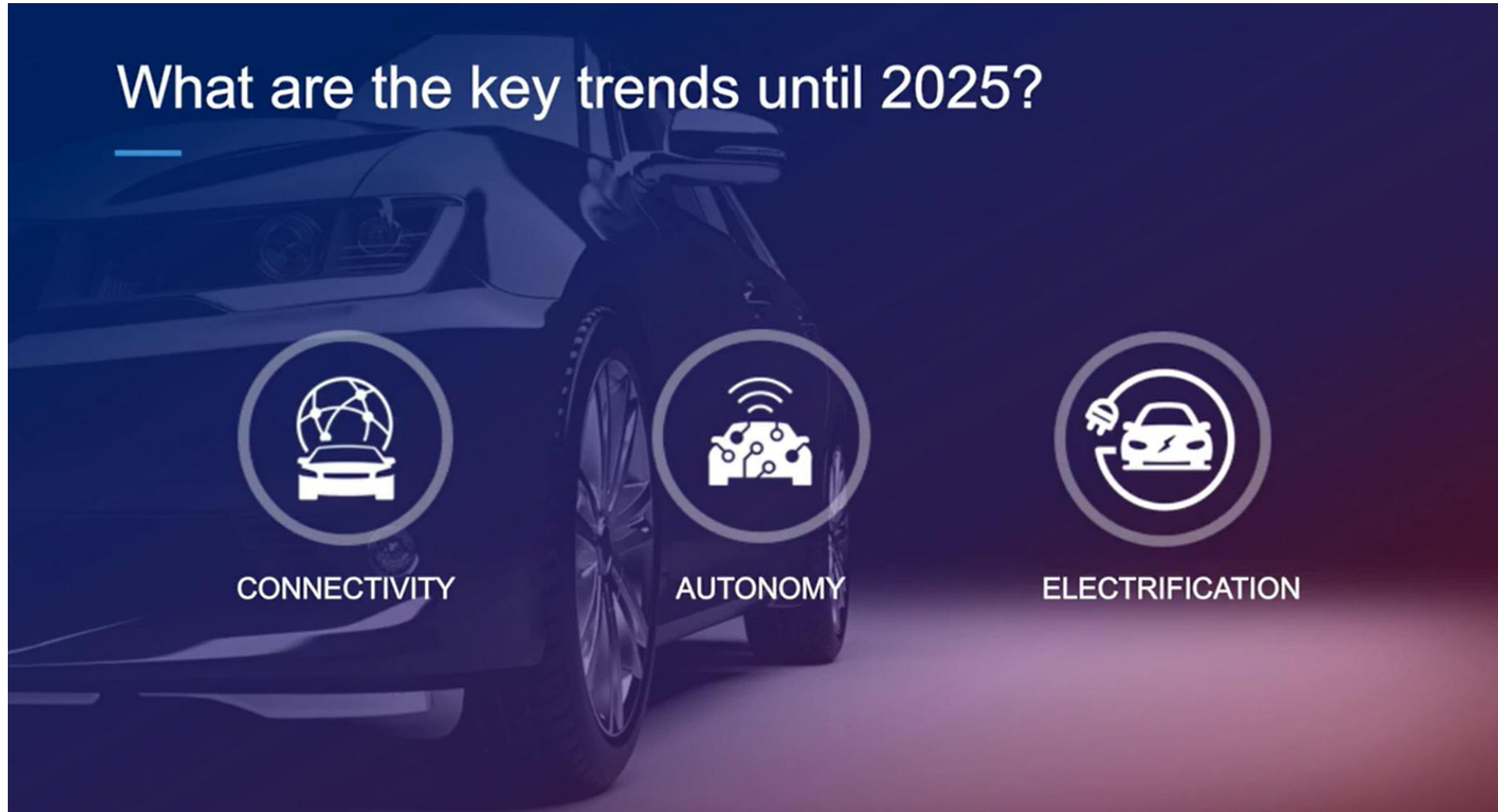
一期厂房: 10800M² x 2层 x 3栋

二期新厂房: 12000M² x 3层 x 1栋

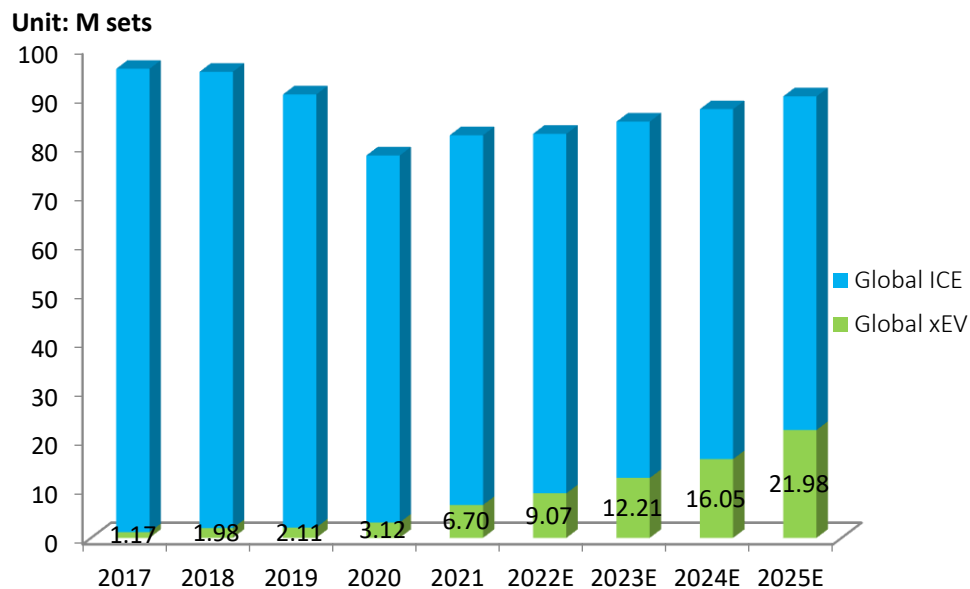
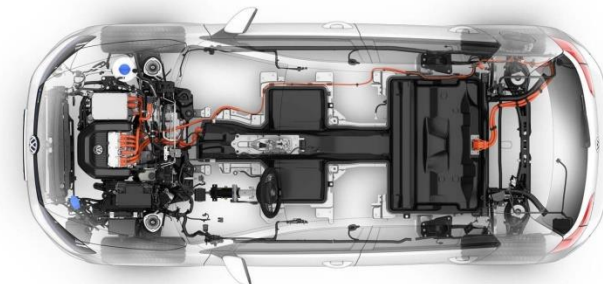
二期新仓库: 4200M²

02 汽车事业部市场推广战略

汽车电子行业大趋势

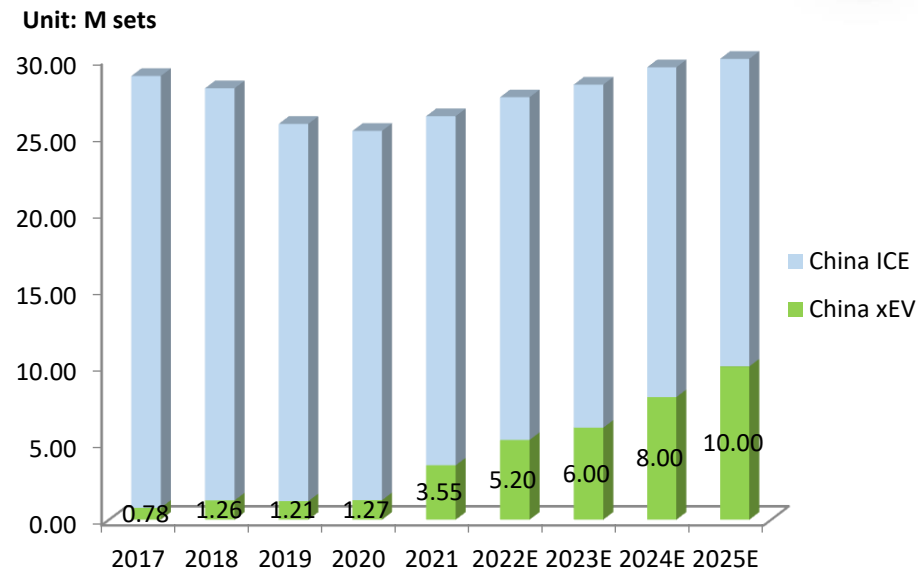


电气化大趋势



Global Market

Source: EVTank



China Market

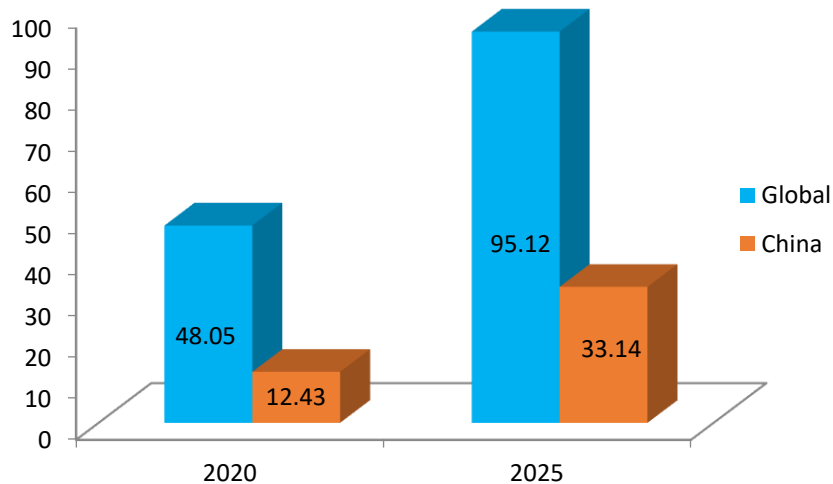
Source: CAAM

- ◆ 2025年预计电动车全球销量达2200万台，占比全球新车销量1/4；
- ◆ 2025年预计中国电动车销量达1000万台，占比中国新车销量1/3。

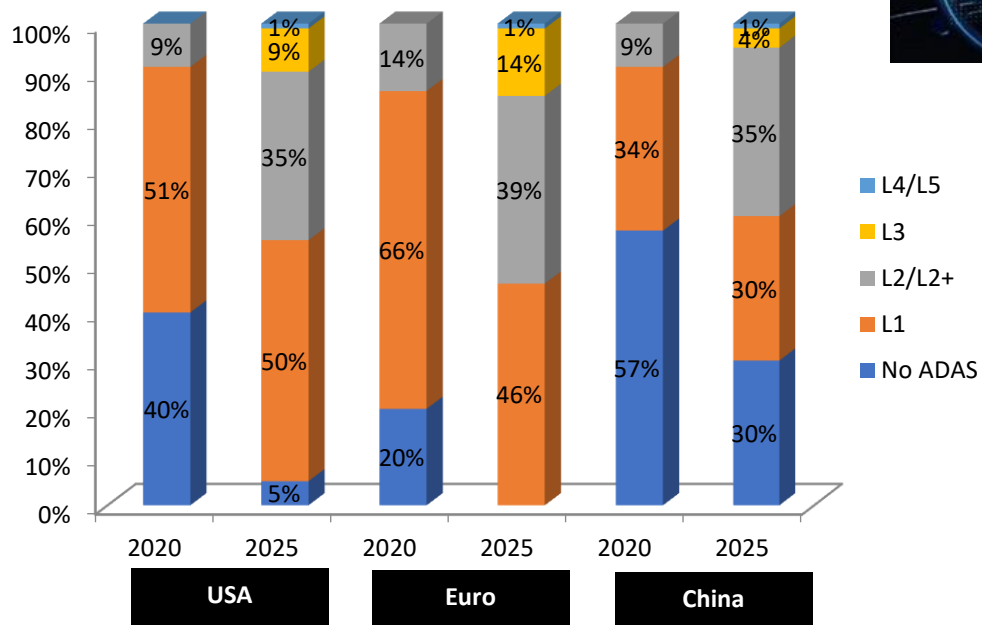
自动化大趋势



Unit: Billion US



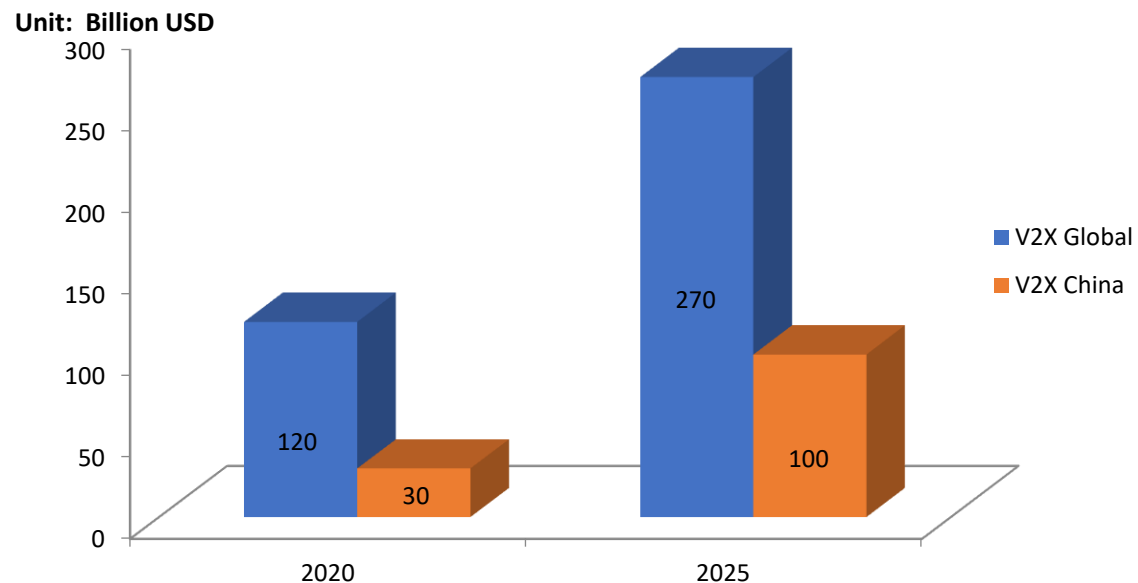
Source: CAAM



Source: Roland Berger

- ◆ 2025年预计ADAS/AD全球市场规模将达950亿美金；
- ◆ 2025年预计ADAS/AD中国市场规模将达330亿美金；
- ◆ 2025年预计中国市场L2（含L2）级别以上智能汽车将占到全年新车40%销售量。

车载网联化大趋势

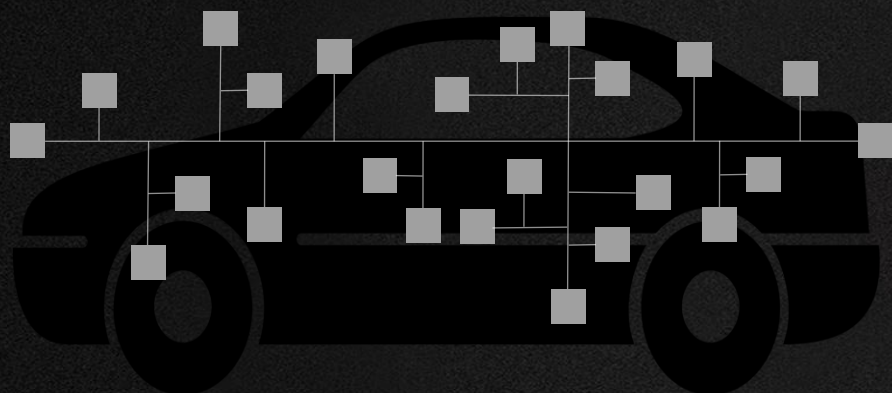


Source: CAAM

- ◆ V2X全球市场规模将达到2700亿美金；
- ◆ V2X中国市场规模将达到1000亿美金。

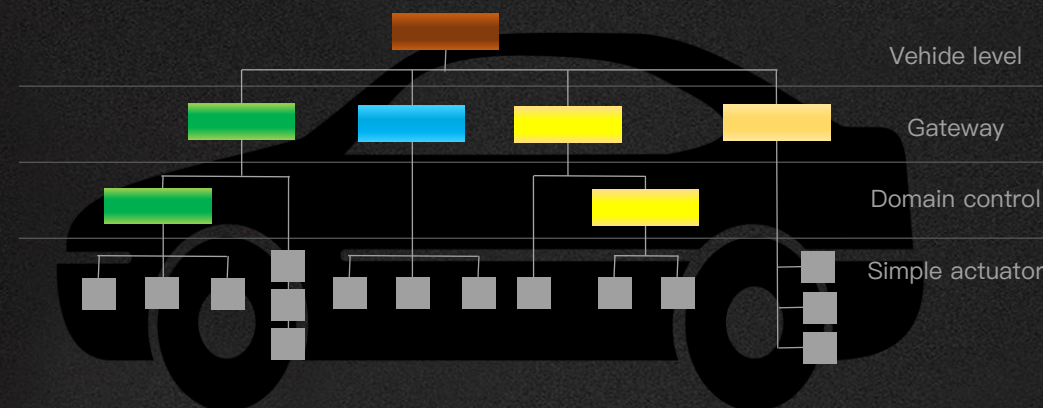
汽车电气架构变革大趋势

目前-分布式架构



- Increasing hardware varieties
- Increasing lines of code in vehicle
- Inefficient development
- Security&functional safety challenges
- Not easily upgraded or scaled

未来-集中式架构



- Higher requirements for AI Cap
- Scalable and easy to develop hardware
- Efficient to develop
- Safe and redundant network
- Upgradable and scalable platform

汽车电子中期战略



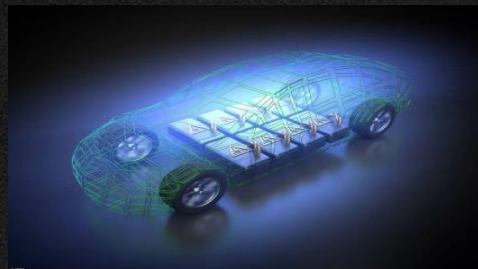
OBC/DCDC/MCU



ADAS/IVI



BCM/V2X



BMS

EDR/EPS/Airbag

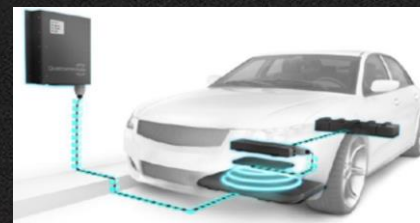
EFP/EWP



ECU/TCU

ABS/VSC/CDC

WEVC



2021-2024

2025-2028

2029-2032

汽车电子业务推广核心领域

OBU for V2X (V2X通信用车载单元)

PTC Heater (PTC加热器)

DC/DC Converter (直流/直流变换器)

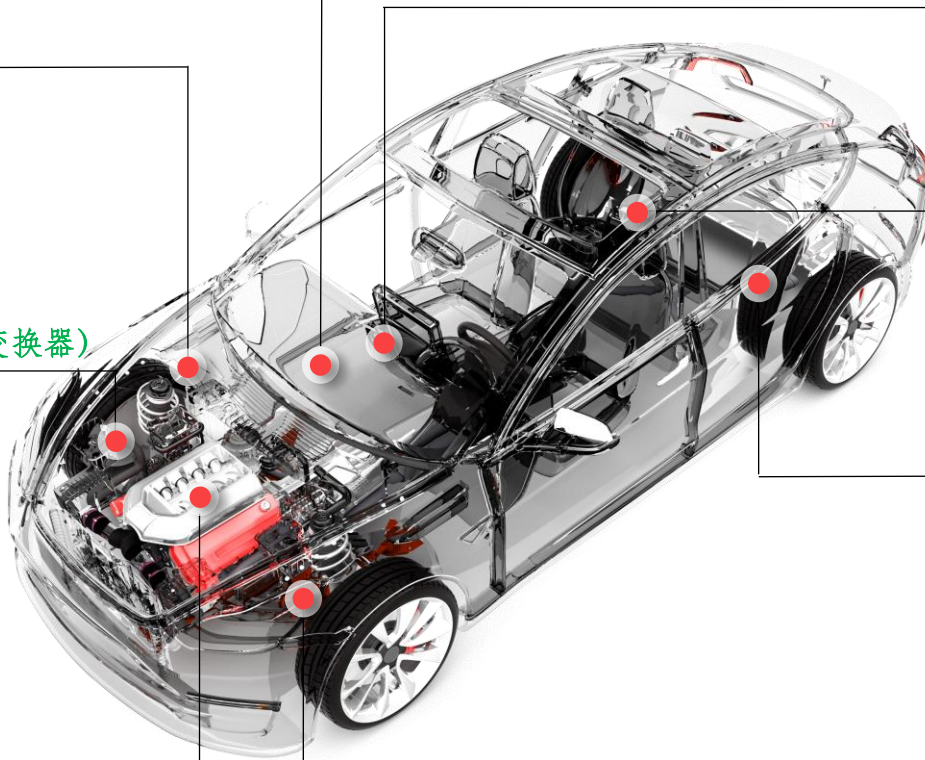
Traction Motor Controller (主驱逆变器)

ADAS/AD Central Module (高级辅助驾驶及自动驾驶模块)

BMS (电池管理系统)

E-Compressor (电动压缩机)

On-Board Charger (车载充电机)



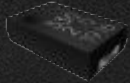
03 汽车级铝电容解决方案

产品类型

纯液态铝电解电容

RADIAL LEADED	SURFACE MOUNT	SNAP IN	SCREW TERMINAL
			
Ranges from low to high capacitance and voltage. Can be found in lighting and consumer electronics applications among others.	Ranges from low to high capacitance and voltage. Can be found in lighting and consumer electronics applications among others.	The Snap In capacitors are relatively large and possess high capacitance and voltage. Applications are primarily for energy and power.	Screw type capacitors are large capacitors characterized by high capacitance and voltage. Found in industrial power supplies as well as new energy applications.
CHARACTERISTICS Size: $\Phi 4 - \Phi 22$ Voltage: 6.3V – 600V Capacitance: 0.1 μ F – 22,000 μ F ESR: as low as 10m Ω Life: up to 20,000 hours (105 $^{\circ}$ C) up to 5,000 hours (130 $^{\circ}$ C) AEC-Q200	CHARACTERISTICS Size: $\Phi 4 - \Phi 18$ Voltage: 6.3V – 450V Capacitance: 2.2 μ F – 18,000 μ F ESR: as low as 10m Ω Life: up to 20,000 hours (105 $^{\circ}$ C) up to 5,000 hours (130 $^{\circ}$ C) AEC-Q200	CHARACTERISTICS Size: $\Phi 22 - \Phi 40$ Voltage: 10V – 600V Capacitance: 39 μ F – 56,000 μ F Life: up to 10,000 hours (105 $^{\circ}$ C) AEC-Q200	CHARACTERISTICS Size: $\Phi 35 - \Phi 100$ Voltage: 10V – 600V Capacitance: 1,000 μ F - 680,000 μ F Life: up to 20,000 hours (85 $^{\circ}$ C) up to 5,000 hours (105 $^{\circ}$ C)

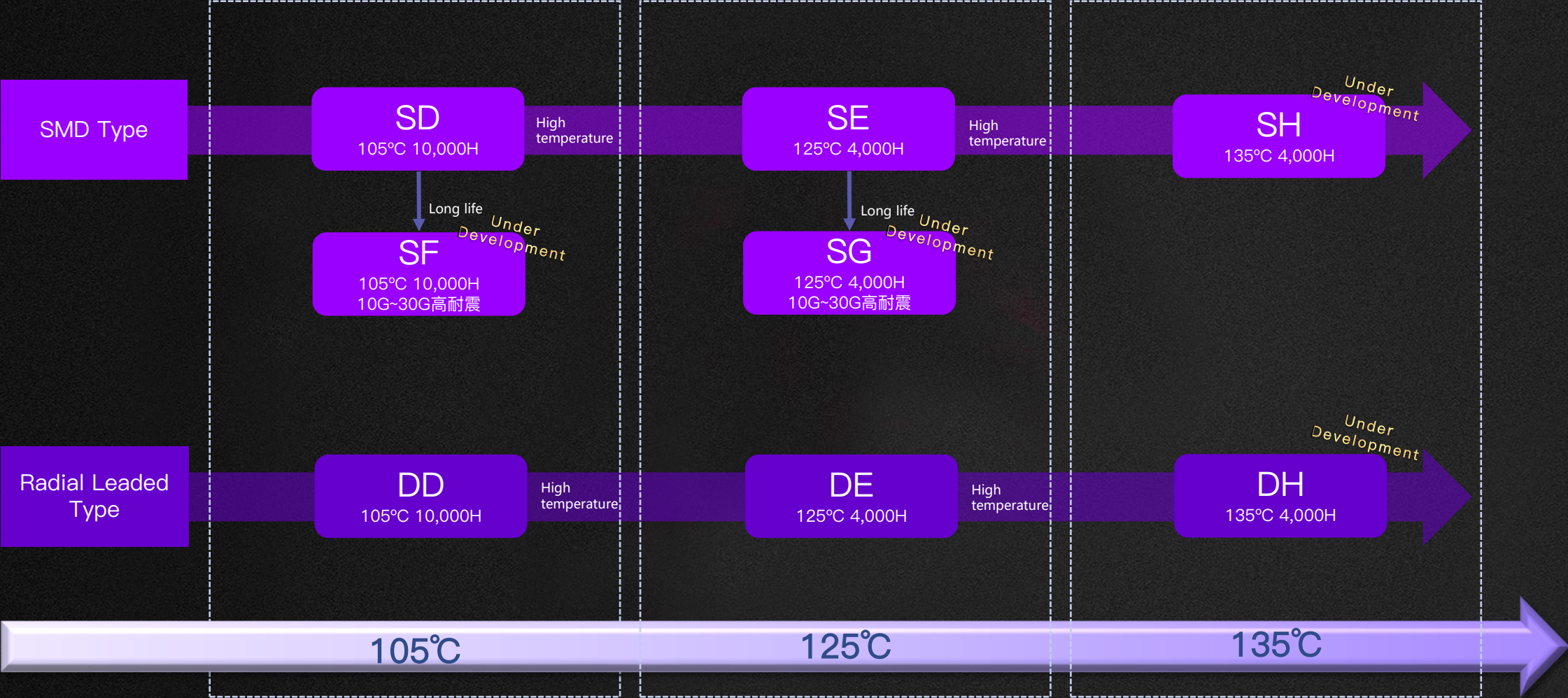
固态及固液混合电容

RADIAL LEADED	SURFACE MOUNT	MLPC
		
Radial Polymer aluminum capacitors combines high capacitance, low ESR, and excellent frequency stability. Found in consumer electronics and lighting.	SMD Polymer aluminum capacitors combines high capacitance, low ESR, and excellent frequency stability. Found in consumer electronics and lighting.	Multi-Layer Polymer Capacitor is a surface mounting capacitor with multiple metal-deposited polymer layers that are continuously laminated together with metal deposition on a polymer film.
CHARACTERISTICS Size: $\Phi 4 - \Phi 18$ Voltage: 2.5V – 200V Capacitance: 4.7 μ F – 5,600 μ F ESR: as low as 5m Ω Life: up to 10,000 hours (105 $^{\circ}$ C) up to 4,000 hours (125 $^{\circ}$ C) AEC-Q200	CHARACTERISTICS Size: $\Phi 4 - \Phi 18$ Voltage: 2.5V – 200V Capacitance: 4.7 μ F – 5,600 μ F ESR: as low as 5m Ω Life: up to 23,000 hours (105 $^{\circ}$ C) up to 4,000 hours (125 $^{\circ}$ C) AEC-Q200	CHARACTERISTICS T Dimension: 2.8 – 1.1 Voltage: 2V – 35V Capacitance: 2.2 μ F – 560 μ F ESR: as low as 3m Ω Operating Temp.: -55 $^{\circ}$ C to 105 $^{\circ}$ C Life: up to 2,000 hours (105 $^{\circ}$ C)

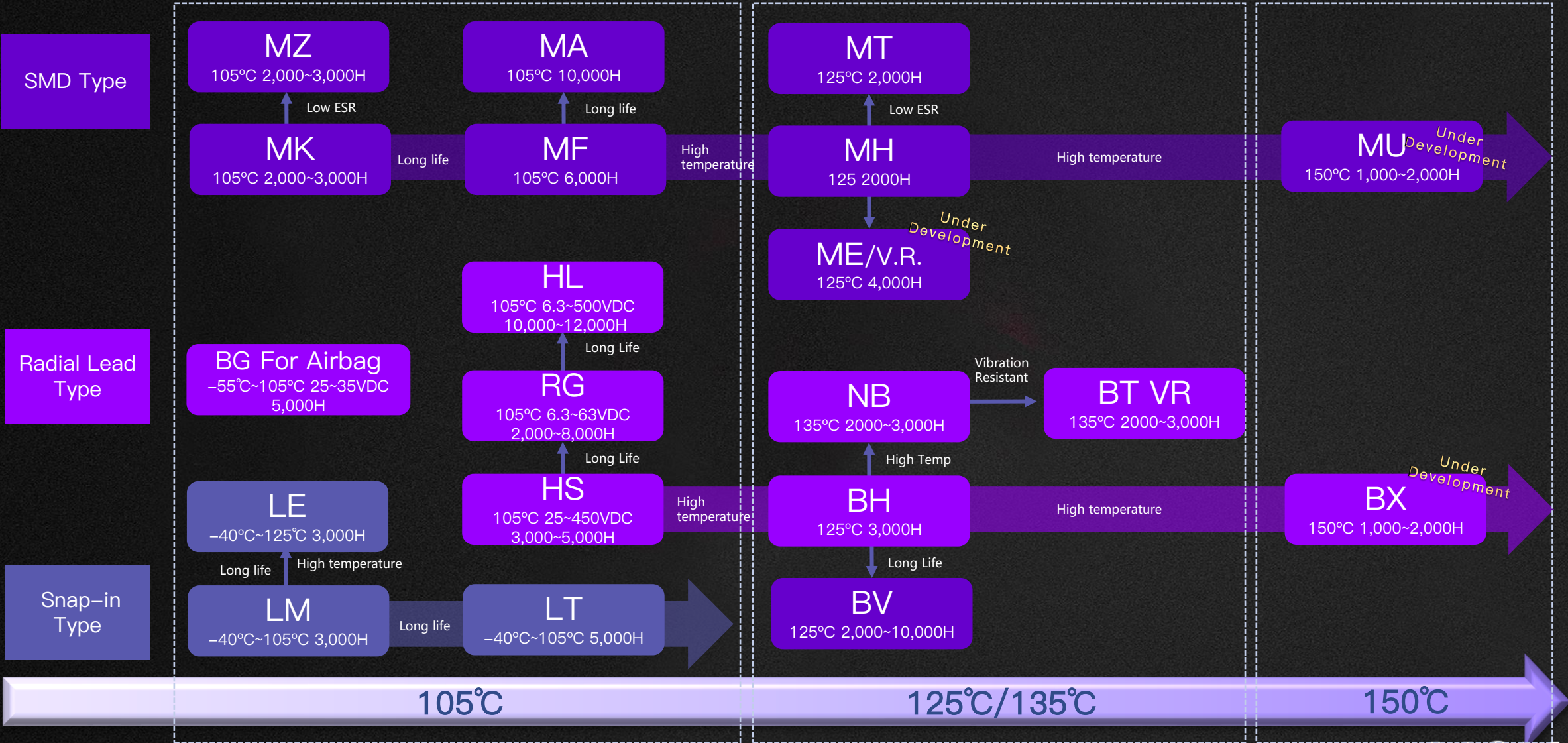
汽车级铝电容电性能参数要求



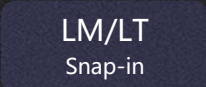
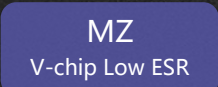
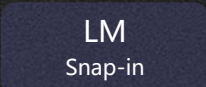
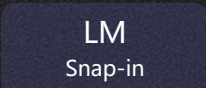
汽车级铝电容发展路线 - 固液混合



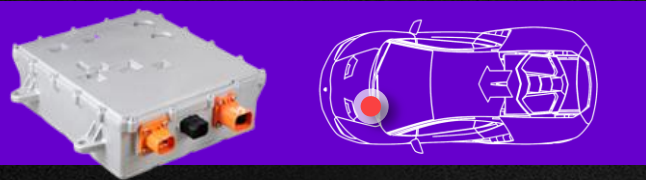
汽车级铝电容发展路线 - 纯液态



汽车电子战略客户

客户	应用	产品系列
 	 xEV  OBC DC-DC	 SE Hybrid  LM Snap-in  FXQ Film-CAP
  	 xEV  OBC DCDC ADAS	 SE Hybrid  LM/LT Snap-in  MT V-chip Low ESR
  	 xEV Powertrain Body control  OBC DC-DC BCM	 MZ V-chip Low ESR  LM Snap-in
 	 Vehicle control MCU	 FDE Film-CAP
  	 Vehicle control MCU	 FY2 Film-CAP  LM Snap-in

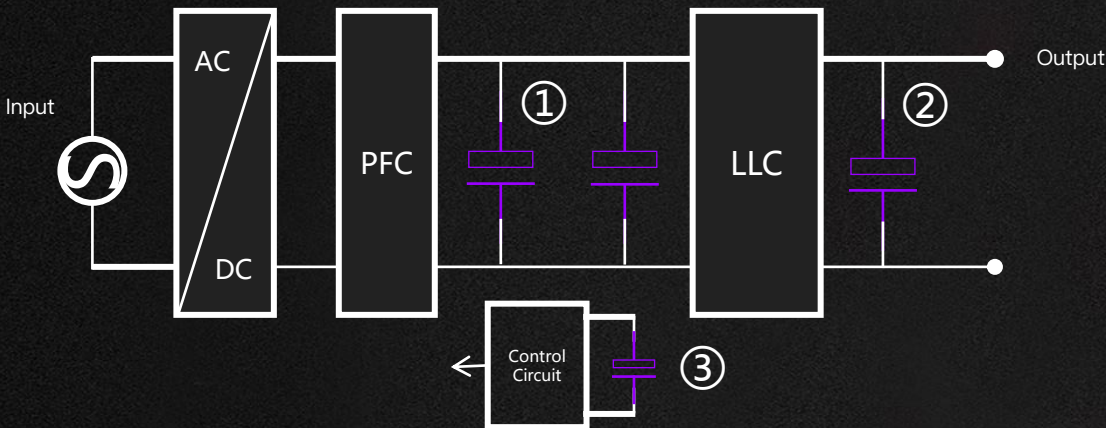
产品推荐方案 - 车载充电机



高可靠性

耐振动

小型化



6.6KW OBC (三合一)

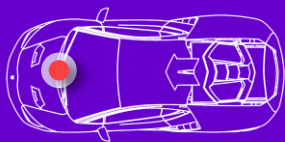
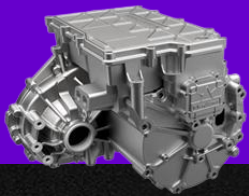


eg. LM 450V330uF

eg. HL 450V47uF

用途	电容功能要求	产品系列推荐		
① PFC DC Link Cap	Smoothing DC Bus Voltage; Vibration Resistant, Surge Resistant, High Reliability	LM -40°C~105°C 3,000H	LT -40°C~105°C 5,000H	HL 105°C 6.3-500VDC 10,000~12,000H
② LLC Output Filtering Cap	Output ripple voltage filtering after rectification; Vibration Resistant, High Reliability	LT -40°C~105°C 5,000H	HL 105°C 6.3-500VDC 10,000~12,000H	
③ low voltage power supply filtering cap	Low voltage power supply smoothing; Vibration Resistant, Low ESR	SE 125°C 4,000H	MT 125°C 2,000H	

产品推荐方案 - 主驱控制器

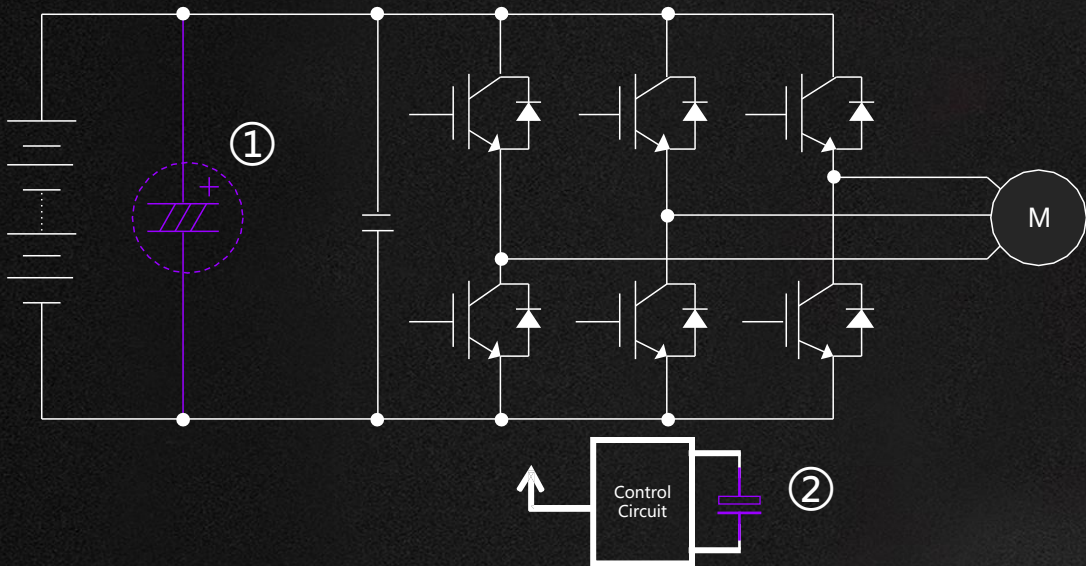


高可靠性

耐振动

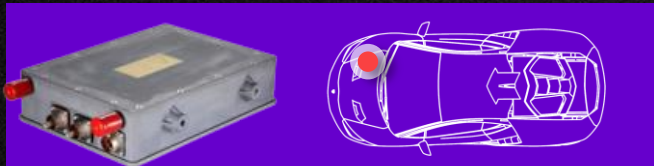
抗冲击

Low ESR



用途	电容功能要求	产品系列推荐		
① DC Link Cap	Smoothing DC Bus Voltage; Vibration Resistant, Surge Resistant, High Reliability	LM -40°C~105°C 3,000H	LT -40°C~105°C 5,000H	HL 105°C 6.3~500VDC 10,000~12,000H
② low voltage power supply filtering cap	Low voltage power supply smoothing; Vibration Resistant, Low ESR	SE 125°C 4,000H	MT 125°C 2,000H	

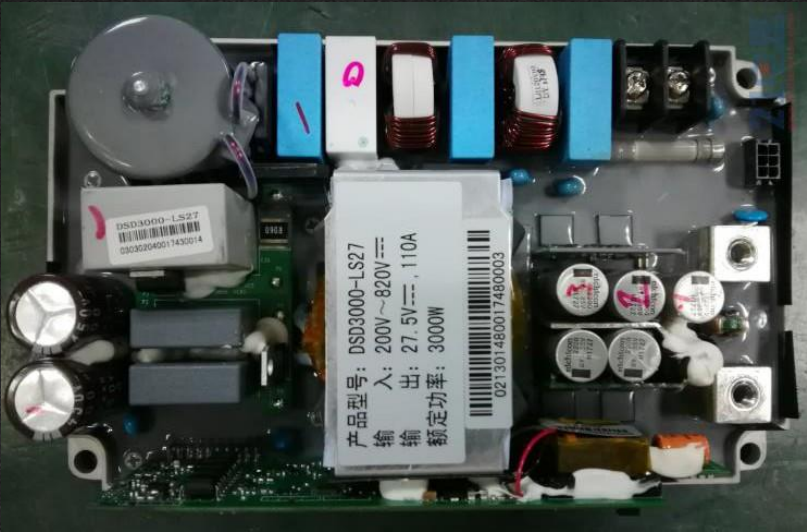
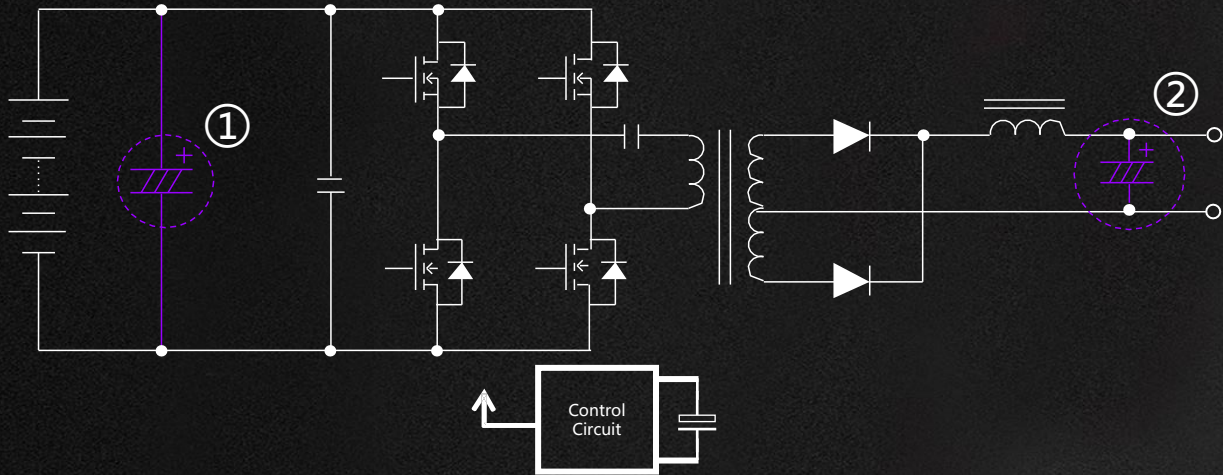
产品推荐方案 – DC/DC转换器



耐高纹波

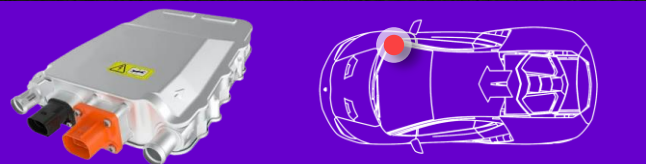
小型化

Low ESR



用途	电容功能要求	产品系列推荐		
① DC Link Cap	Smoothing DC Bus Voltage; High Voltage Resistant, High Ripple Current, High Reliability	LM -40°C~105°C 3,000H	LT -40°C~105°C 5,000H	HL 105°C 6.3~500VDC 10,000~12,000H
② Output Filtering Cap	Output ripple voltage filtering; High Ripple Current, Low ESR	SE 125°C 4,000H	SD 105°C 10,000H	BH 125°C 3,000H

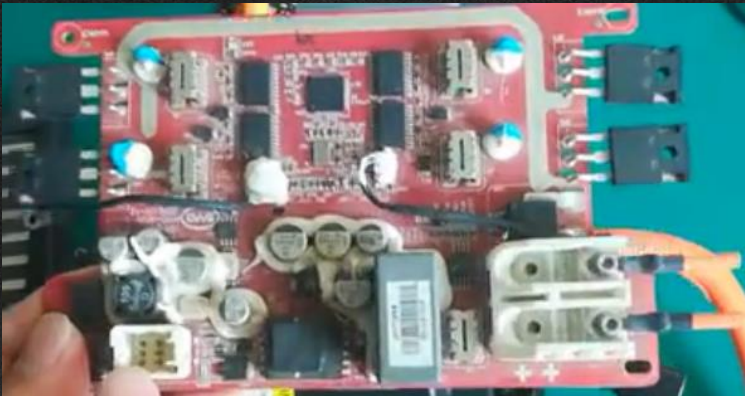
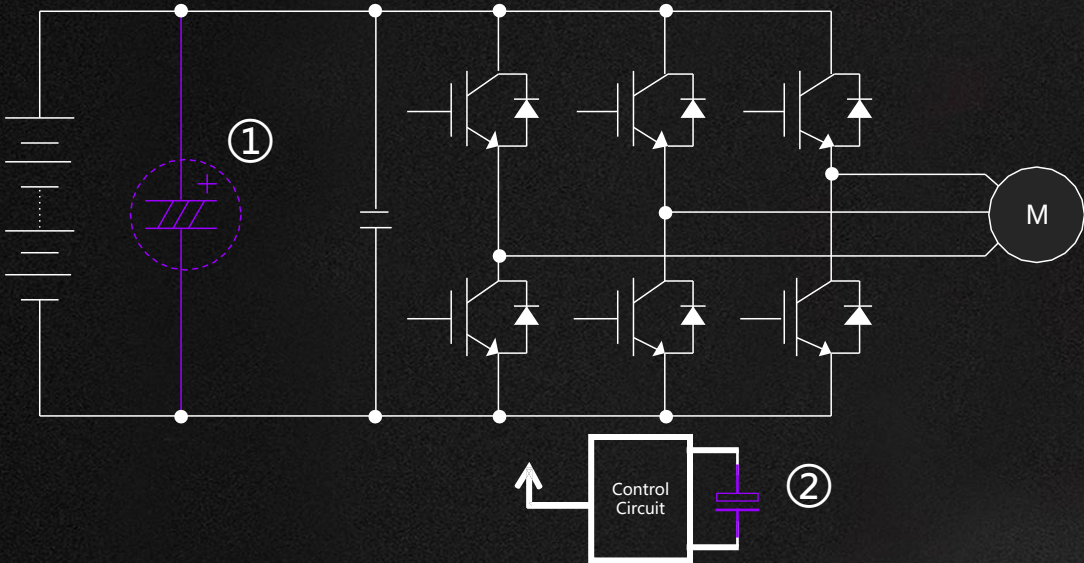
产品推荐方案 – PTC加热器



高可靠性

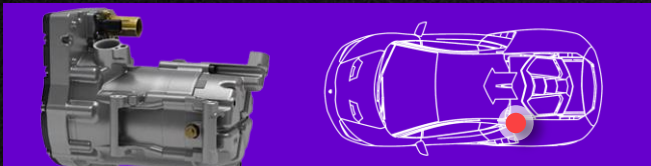
耐振动

Low ESR



用途	电容功能要求	产品系列推荐	
① DC Link Cap	Smoothing DC Bus Voltage; Vibration Resistant, Surge Resistant, High Reliability	LM -40°C~105°C 3,000H	HL 105°C 6.3~500VDC 10,000~12,000H
② low voltage power supply filtering cap	Low voltage power supply smoothing; Vibration Resistant, Low ESR	SE 125°C 4,000H	MF 105°C 6,000H

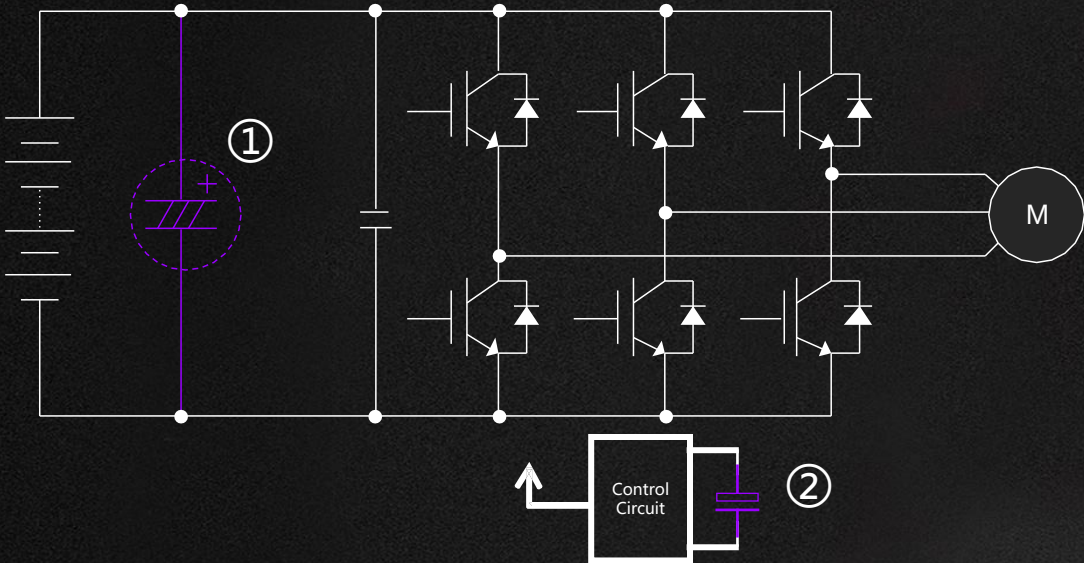
产品推荐方案 - 电动压缩机



耐高压

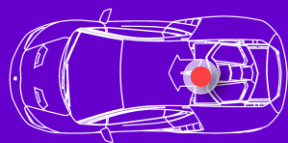
耐高纹波

Low ESR



用途	电容功能要求	产品系列推荐		
① DC Link Cap	Smoothing DC Bus Voltage; High Capacitance, High Ripple Current, Low ESR	LM -40°C~105°C 3,000H	LT -40°C~105°C 5,000H	HL 105°C 6.3~500VDC 10,000~12,000H
② low voltage power supply filtering cap	Low voltage power supply smoothing; Vibration Resistant, Low ESR	SE 125°C 4,000H	SD 105°C 10,000H	MF 105°C 6,000H

产品推荐方案 - 电池管理系统

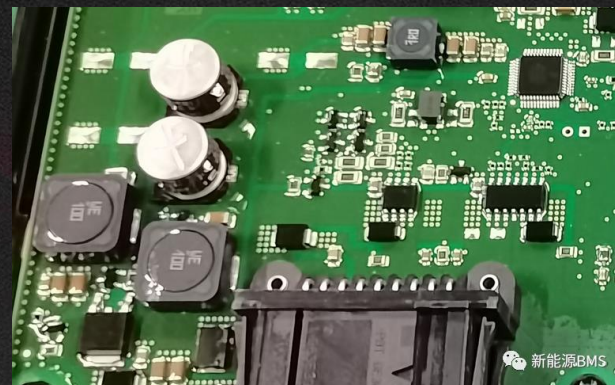
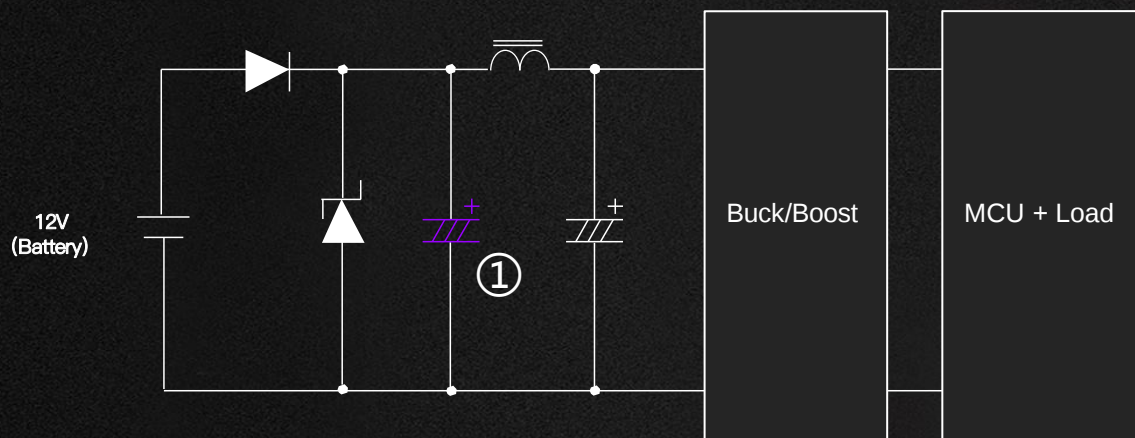


高可靠性

耐振动

宽温度

Low ESR



用途

电容功能要求

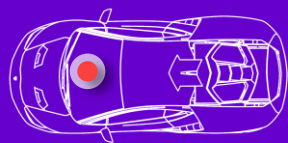
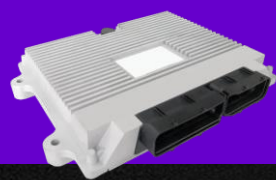
产品系列推荐

① Input Filtering Cap

Input ripple voltage filtering
Vibration Resistant, High Capacitance, Wide Temp., Low ESR

SE
125°C 4,000H

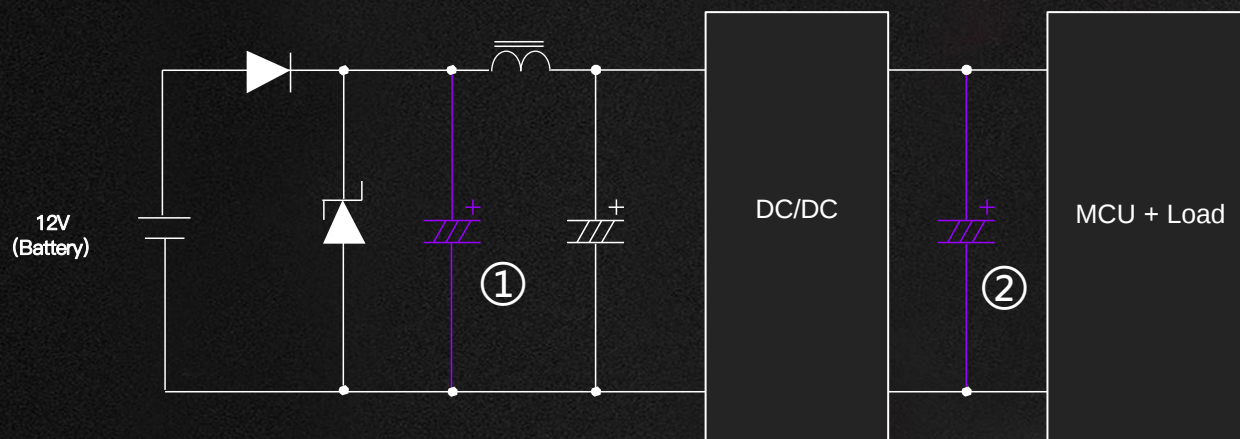
产品推荐方案 – ADAS域控制器



耐高纹波

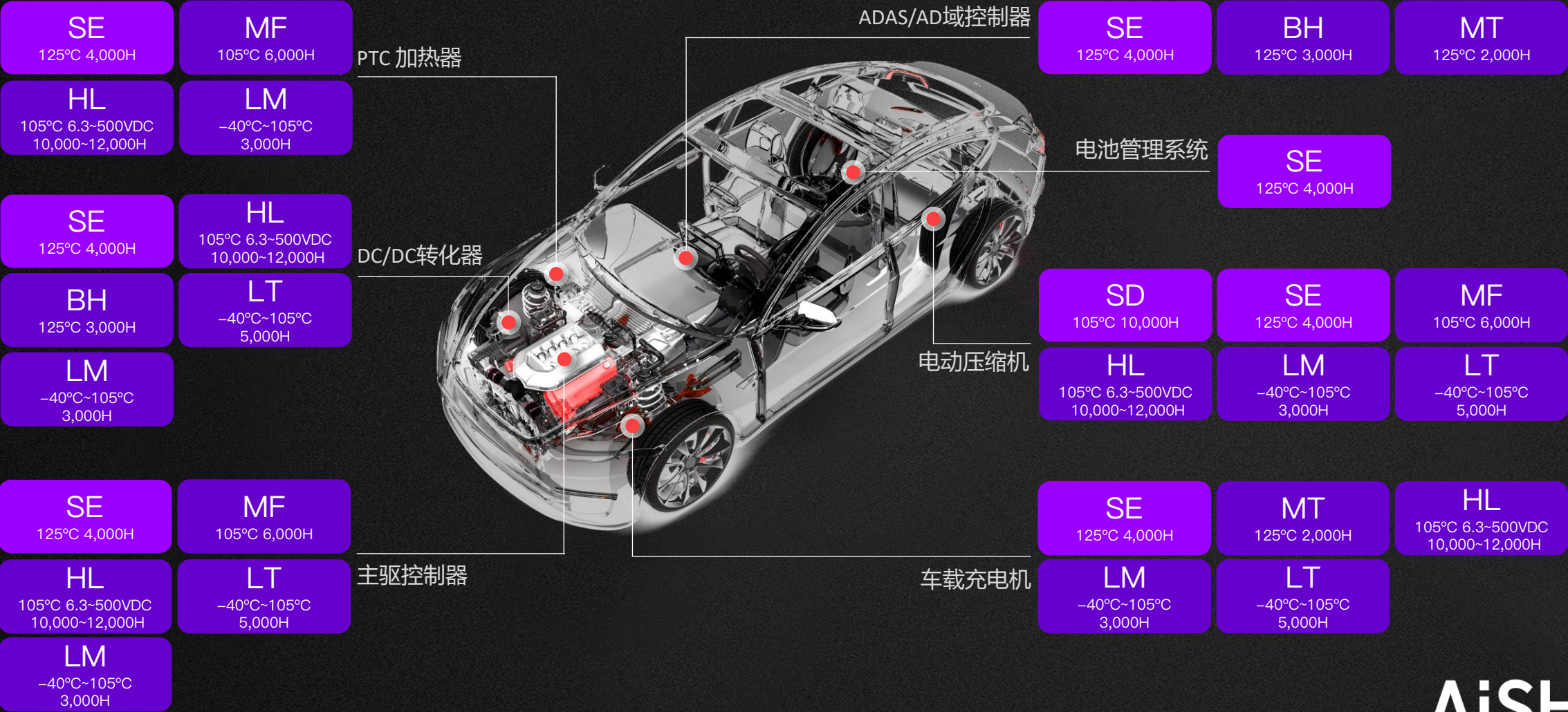
Low ESR

小型化



用途	电容功能要求	产品系列推荐		
① Input Filtering Cap	Input ripple voltage filtering Vibration Resistant, High Capacitance, Wide Temp.	SE 125°C 4,000H	BH 125°C 3,000H	MT 125°C 2,000H
② Output Filtering Cap	Output ripple voltage filtering; Vibration Resistant, Low ESR, High Capacitance, Wide Temp.	SE 125°C 4,000H	BH 125°C 3,000H	MT 125°C 2,000H

汽车级铝电解电容方案概览



友商产品系列对比 - 纯液态贴片

最高温度&寿命 (SMD)	Aishi	Panasonic	Nichicon	Ncc	Rubycon
105°C 2~3khrs	MK 105°C 2000~3000h	HB	UUX	MVE/MVJ/MVY	SKV
105°C 6Khrs	MF 105°C 6000h	HD	UUL	MLK	SLV
105°C 10khrs	MA 105°C 10000h	FH	ULV	MLF	TRV
125°C 1~5khrs	MH 125°C 1000~5000h	TG	UUB	MVH	
105°C 2~5khrs (Low ESR)	MZ 105°C 2000~5000h	FK/FKS/FP	UCL	MZA/J./K./R./S. MLA	TZV/TLV/TPV
125°C 2khrs (Low ESR)	MT 125°C 2000h	TK	UCZ/UCH	MHB/MHJ/MHK	TXV

友商产品系列对比 - 固液混合&牛角

最高温度&寿命 (Hybrid)	Aishi	Panasonic	Nichicon	Ncc	Rubycon
125°C 4khrs (V-Chip)	SE	ZC	GYA	HXC	PFV/CFV
105°C 10Khrs (V-Chip)	SD	ZA	GYB	HXD	PEV/CEV
125°C 4khrs (Radial)	DE	ZC-A		HSC	PZF/CZF
105°C 10khrs (Radial)	DD	ZA-A		HSD	PZE/CZE
最高温度&寿命 (Snap-in)	Aishi	Panasonic	Nichicon	Ncc	Rubycon
105°C 3khrs	LM		LGU/LGN/LGG	KMM/KXB	MXK
105°C 5Khrs	LT		LGY	LXQ/LXS/LVA	VXH

艾华车载业务情况及未来目标

 **64** Millions

 **18** Millions

2021

 **400** Millions

 **160** Millions

2025

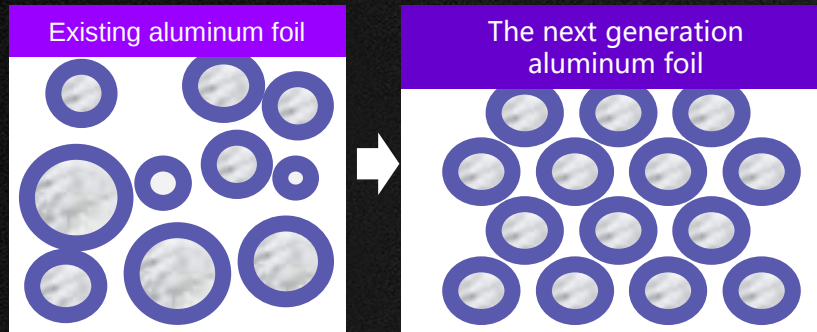
 **700** Millions

 **260** Millions

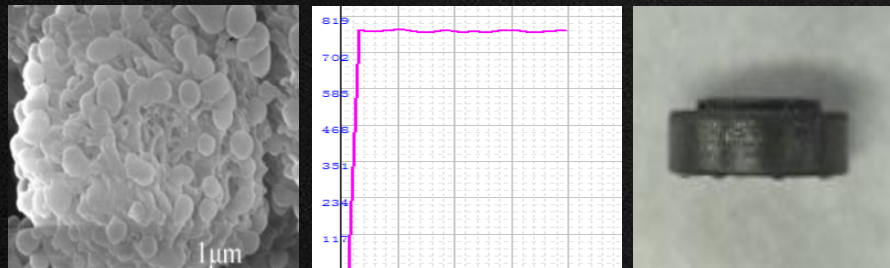
2030

产品核心科技

材料科技

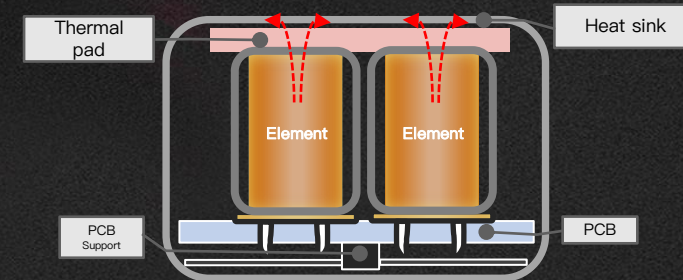
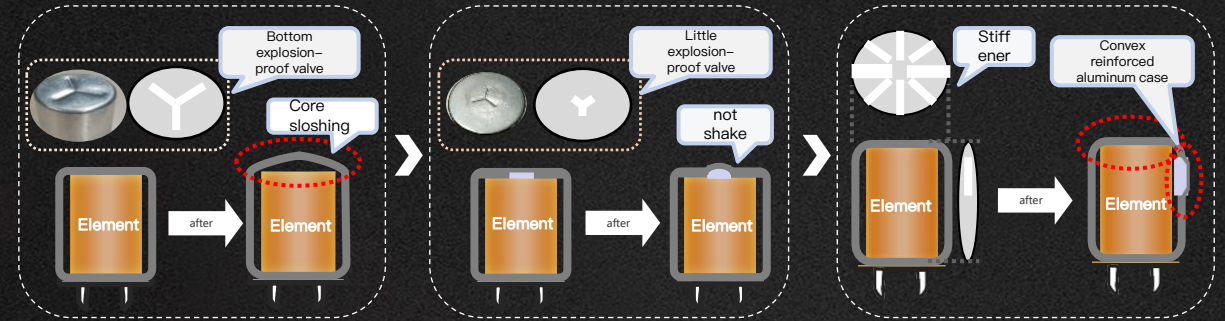


The better holes structure, the higher capacitance realized.



The new polymer materials Withstand voltage of electrolyte Sealing material
High temperature resistance Solvent resistance

结构技术

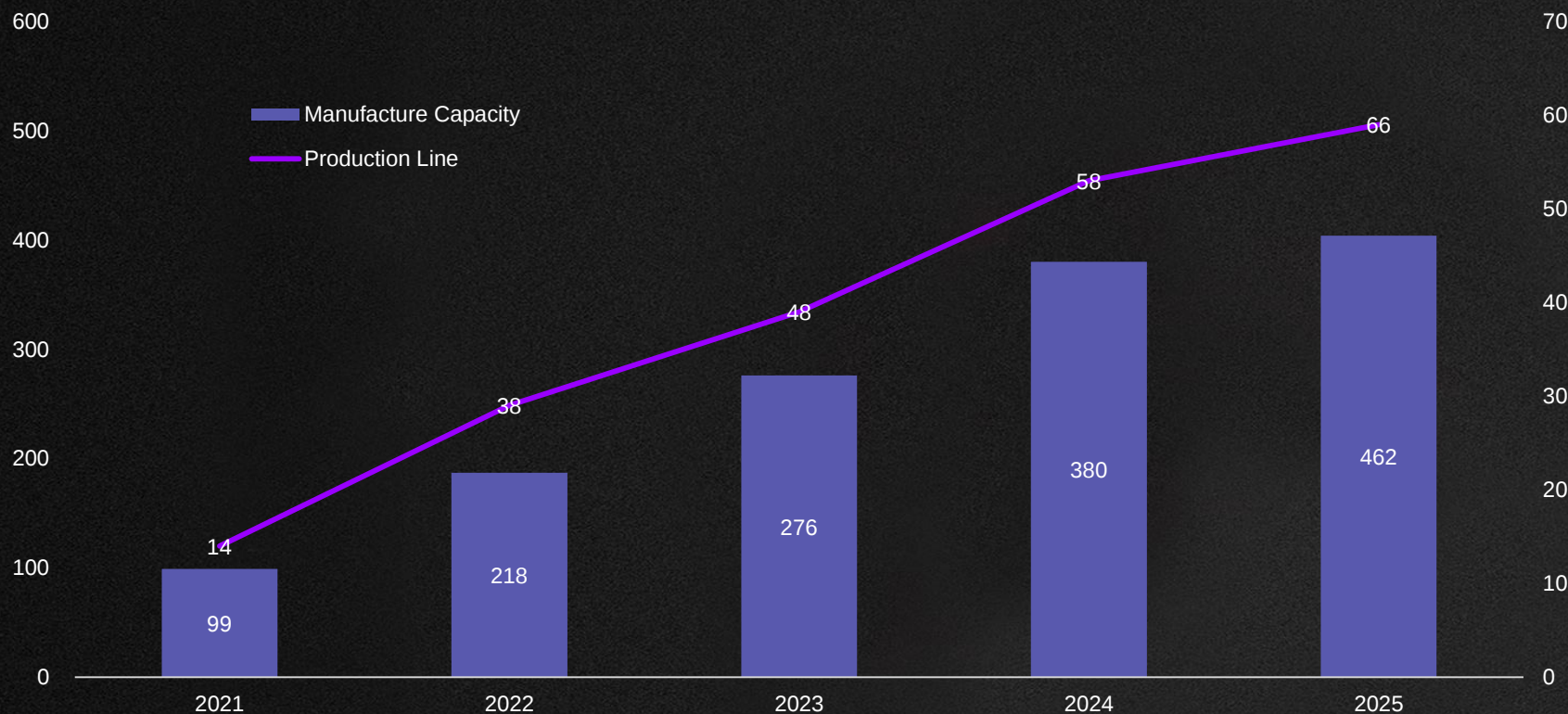


AiShi
THINK AHEAD.

04 汽车事业部产线及产能准备

产能投资与扩张

汽车电子产线产能投资计划



14→66

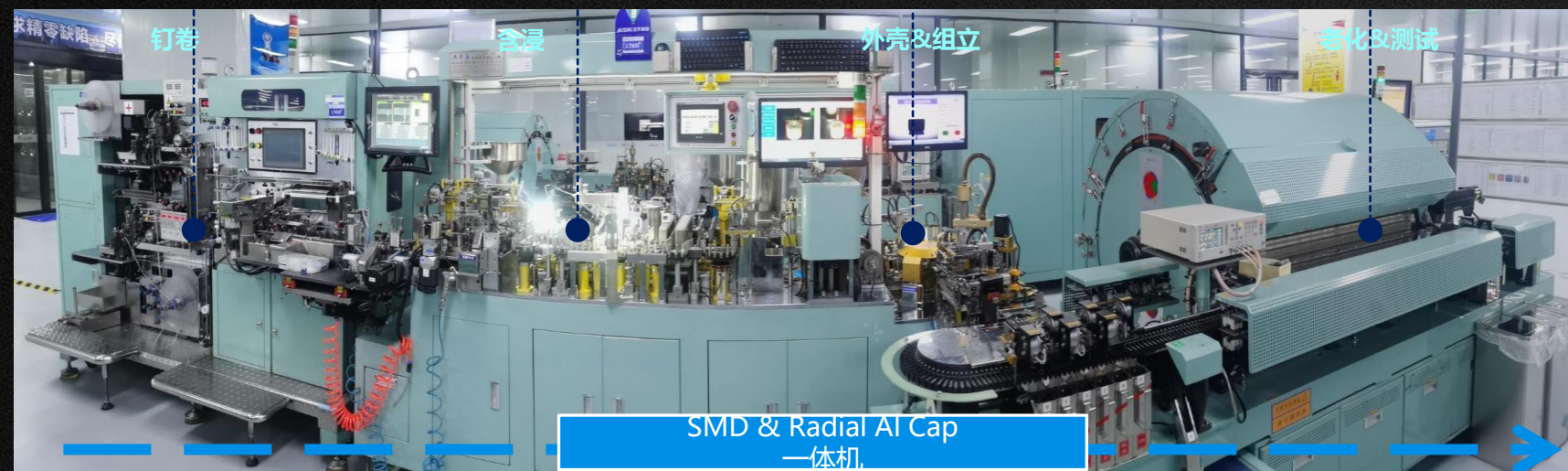
dedicated production lines
from 2022 to 2025

462M

Pieces output by 2025

从2022年到2025年，计划将汽车级产品专用线从14条扩大到66条，随之而来的是，产能将从每年9900万件增加到4.62亿件。

汽车级产品生产线概览



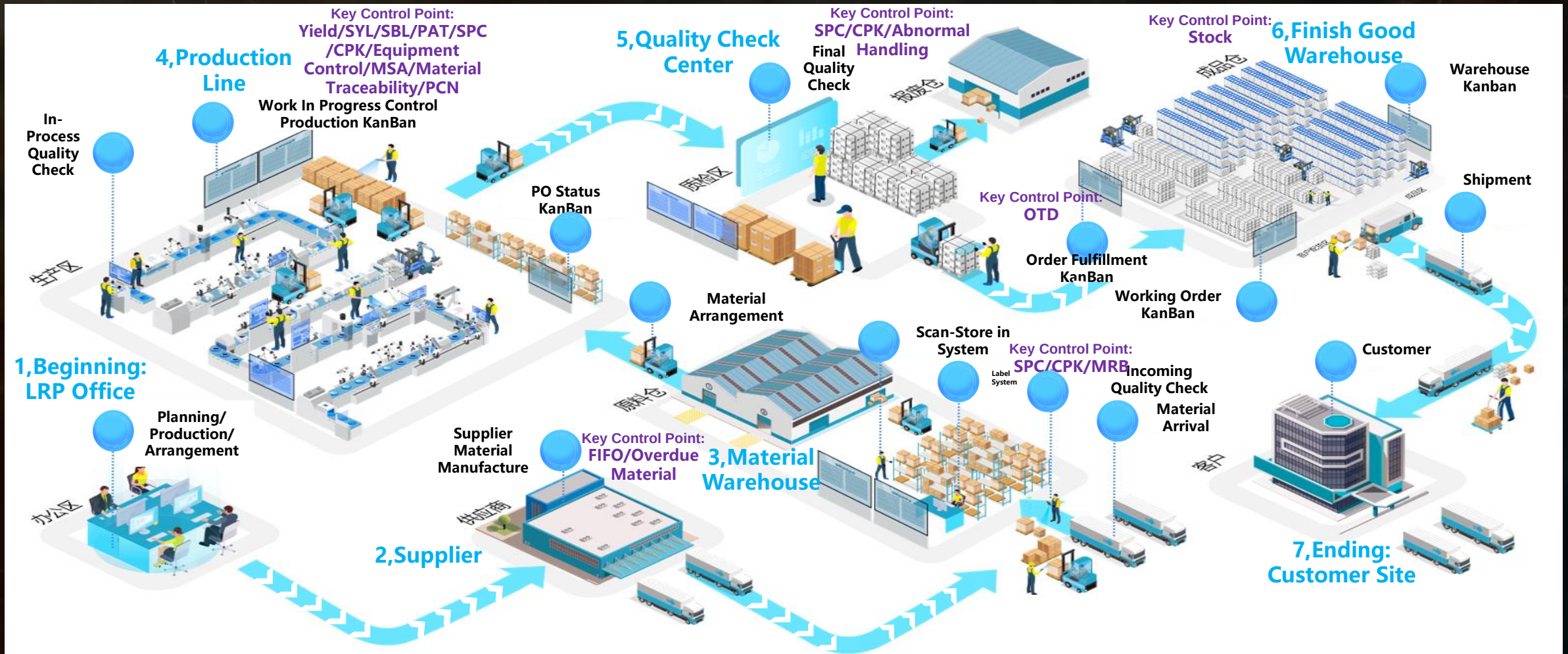
- 改善产品电气参数特性一致性
- 缩短生产周期

- 改善产品电气参数特性一致性
- 缩短生产周期
- 降低混料风险



牛角“U”型自动装配产线

艾华集团IT化智能制造



产品可靠性

电容器测试

CNAS and ISO 17025 认证实验室

可靠性标准: IEC60384-4 & AEC Q-200

可进行30多项测试, 如负载寿命、保质期、温湿度、浪涌、高G冲击等。

测试应用类型

汽车、工业、照明、家电、电脑等



谢谢！