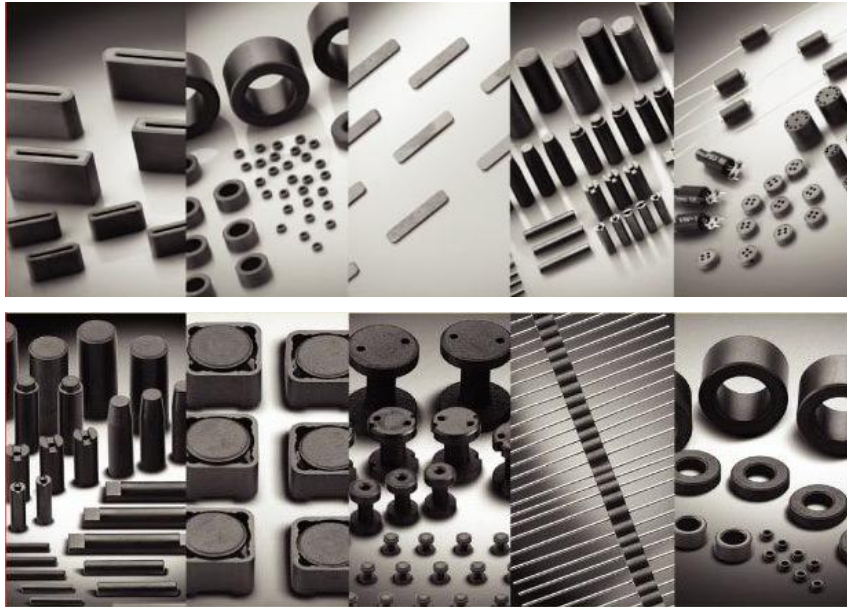




ACME Electronics Corporation

Aggressively Committed to Manufacturing Excellence



Company Introduction

ACME Electronics

Aggressively Committed to Manufacturing Excellence

Key Data

Core Business **MnZn & NiZn Soft Ferrite Production**

Sales **Approx US\$135M**

R&D Expenses **5% of Sales**

No of Plants **4**

Total Employees **1,700**

History

1991 **- ACME Electronics Corp. incorporated**

1994 **- Kuan-Yin Factory operational**

2000 **- ACME Electronics (Kunshan) established**

2005 **- Incorporation of ACME Electronics (GuangZhou)**

2009 **- Acquires ACME Ferrite Products Malaysia**

USI Group

Petrochemical Division

- USI Corp.
- Asia Polymer
- Taita Chemicals
- CGPC
- Taiwan VCM Corp.

Storage & Dist Division

- CGTD
- USI (HK)
- CLT
- FR Shanghai

Electronics Division

- **ACME**
- FAC
- Thintec
- USC
- USIO

Plastics Division

- Swanson

Investment Arm

- USII
- TUVM
- TUVVC

ACME Group of Companies



*ACME Kunshan
China*



*Head Office
Taiwan*



*ACME GuangZhou
China*



ACME Malaysia

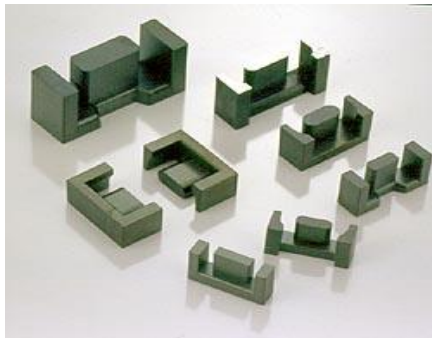


*ACME KwanYin
Taiwan*

ACME Group

Manganese Zinc Soft Ferrites

- ACME KuanYin (Powder)
- ACME GuangZhou
- ACME Kunshan



Nickel Zinc Soft Ferrites

- ACME KuanYin
- ACME Malaysia
- ACME GuangZhou



- ***Founded: 1994***
- ***Location: KuanYin Taiwan***
- ***Nature of Business: R&D,***
- ***Soft Ferrite Powder Production***
- ***Production Capacity: 12,000 Tons/year***
- ***Area: 20,000 m²***



- **Founded: 2005**
- **Nature of Business: MnZn Soft Ferrites**
- **Production Capacity: 6500 Tons/Year**
- **Certification: ISO/TS 16949, ISO14001**
- **Area: 120,000m²**
- **Employees: 650**



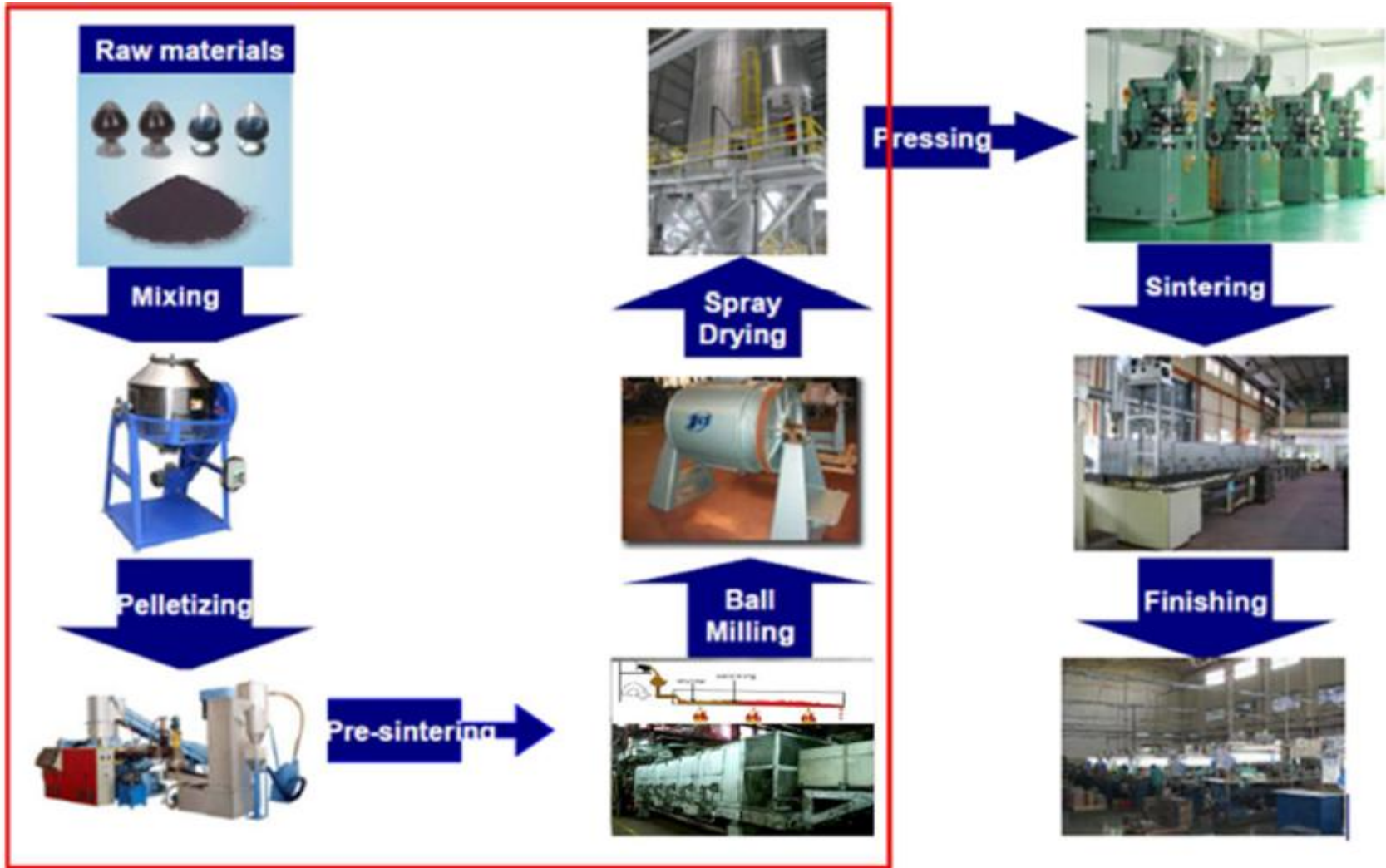
- **Founded: 2000**
- **Nature of Business: MnZn Soft Ferrites**
- **Production Capacity: 7200 Tons/Year**
- **Certification: ISO/TS 16949, ISO14001**
- **Area: 163,270m²**
- **Employees: 450**



- ***Founded: 1987***
- ***Nature of Business: NiZn Soft Ferrites***
- ***Production Capacity: 100Tons/Mth***
- ***Certification: ISO/TS 16949, OHSAS 18000, ISO14001***
- ***ROHS & REACH Compliant***
- ***Area: 16,187 m²***
- ***Employees: 400***



Process of Mn-Zn Ferrite



Process of Mn-Zn Ferrite Powder(1)



Mixing



Pelletizing

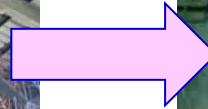


Calcination

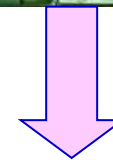


Ball Mill

Spray Drying

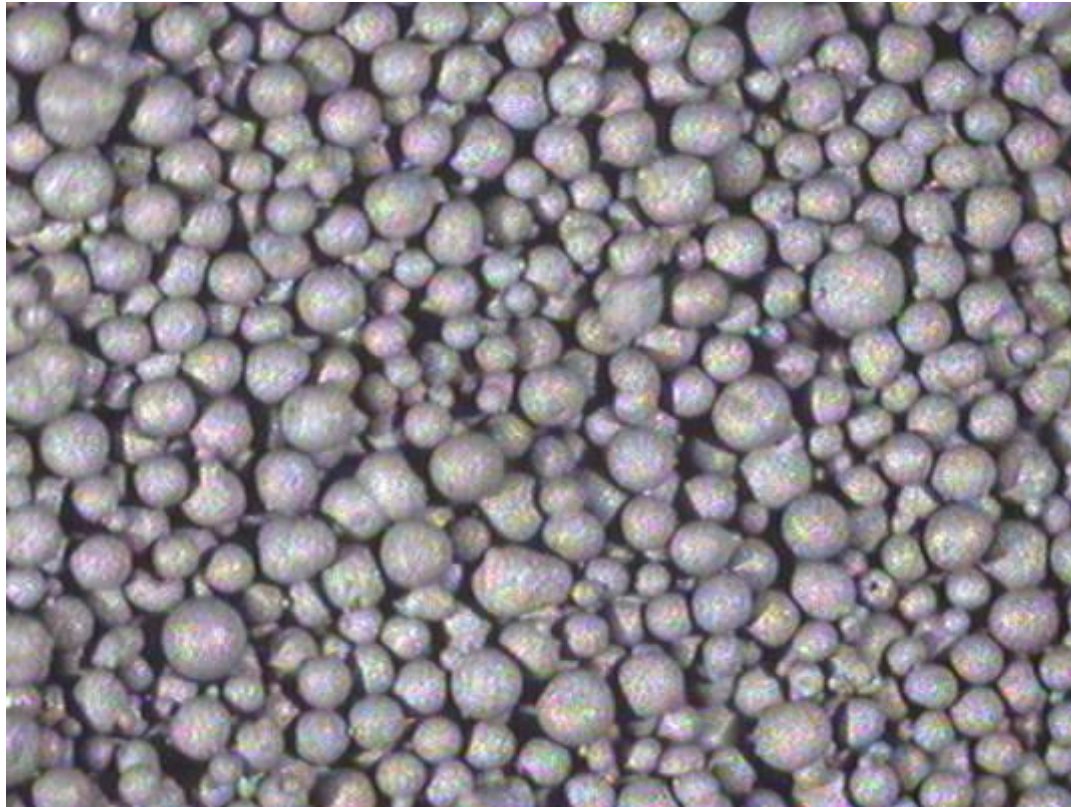


Blending



Pressing

Process of Mn-Zn Ferrite Powder(3)



Manufacture process of Ferrite



Pressing Machines for Mn-Zn Ferrites



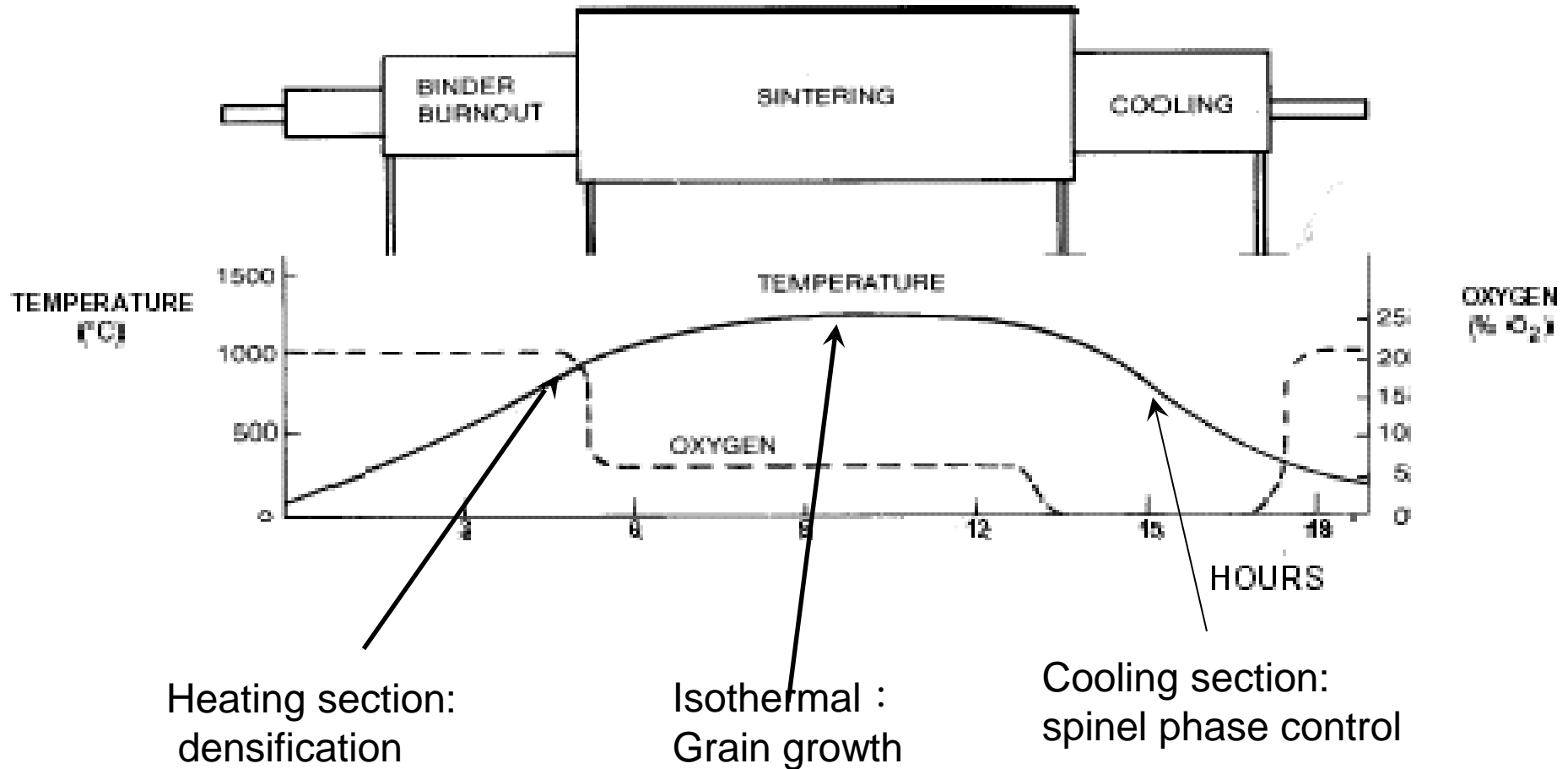
Sintering Kiln of Mn-Zn Ferrites



Manufacture process of Ferrite



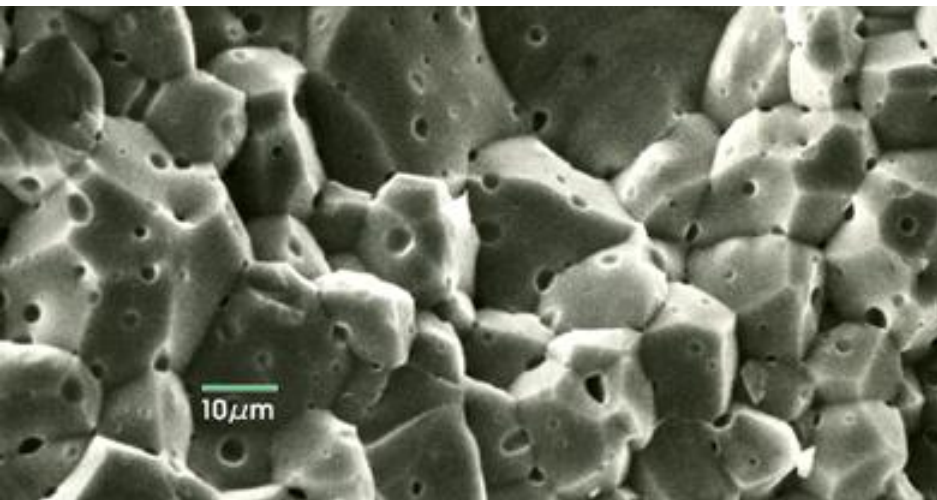
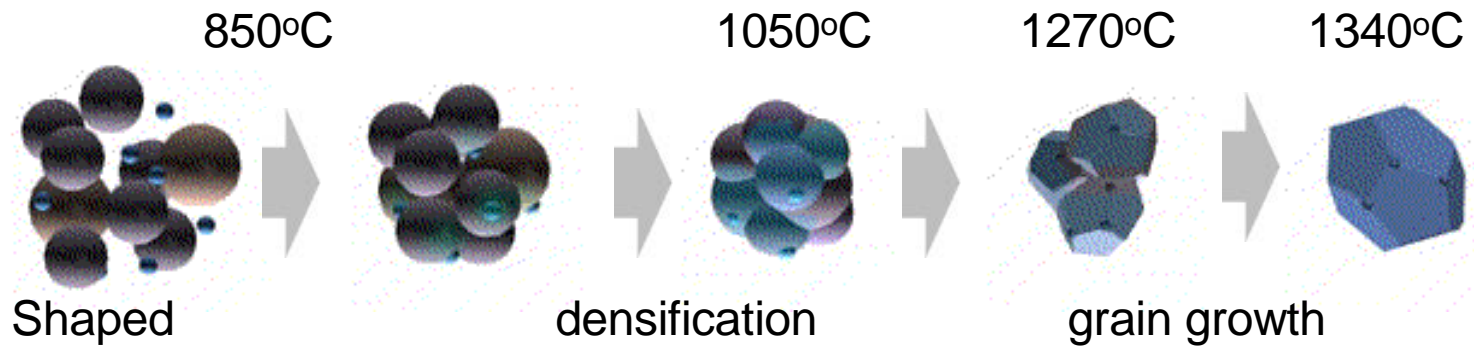
Typical Sintering Profile



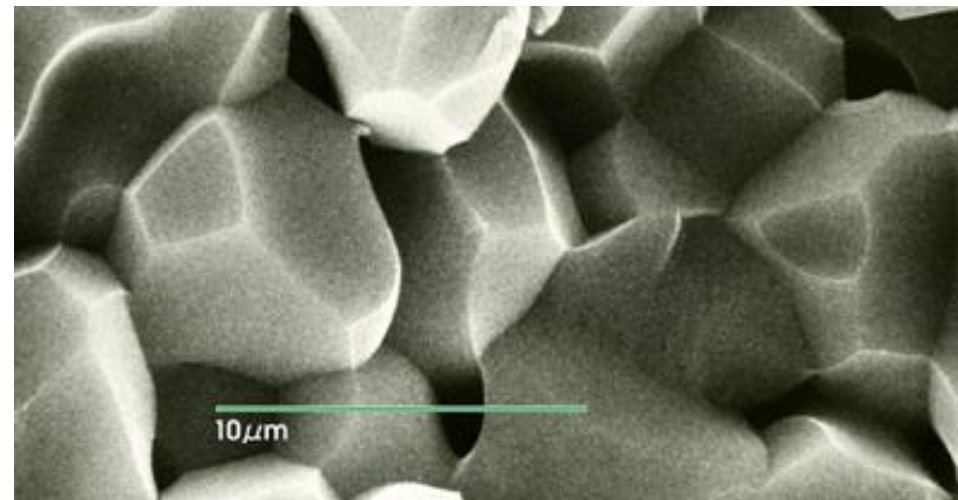
Manufacture process of Ferrite



Sintered Densification



Poor densification



Good densification

Automotive Electronics Solution



KEY: Si MEMS, magnetic, light sensors

Throttle, EGR valve position, manifold air pressure, altitude, mass air flow, DPF, common fuel rail, oil, start-stop, EGR, continuous transmission

Compass, HVAC position, sunroof, wipers, HVAC solar sensor, head-up display brightness, rain, auto dimming mirror, automatic lights, steering angle

Trunk / door lock switches, electric windows, HVAC, HUD, air quality, temp, anti-fog, in dash navigation gyroscope, night vision

Cam/crankshaft position, engine speed, throttle by wire, engine oil, brake fluid level

airbag accelerometer, roll detection, passenger occupation, in-cylinder pressure, active suspension accelerometer

RKES Antenna

Various brushless DC motors, cooling fan, coolant level, ABS, pedestrian detection, crash sensing (ultrasound)

Starter / alternator, stop - start systems

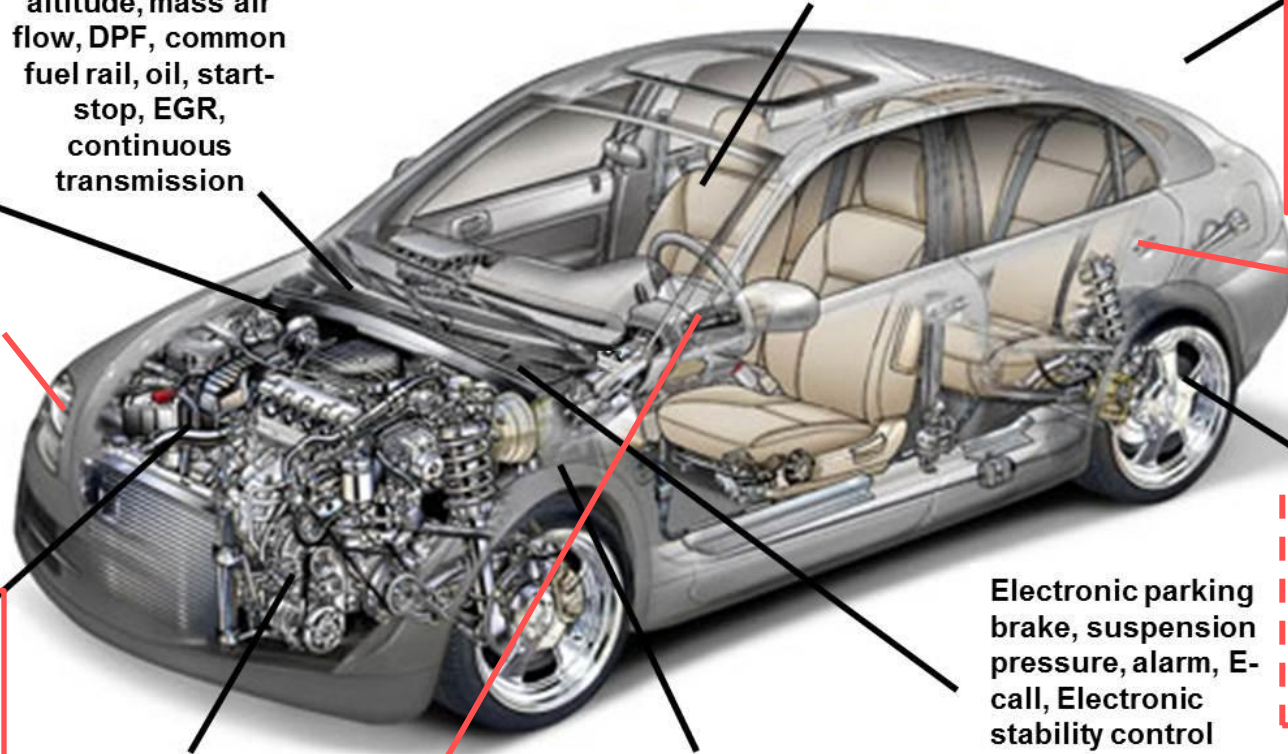
Power steering

Transmission gear position, speed, accelerator pedal position

Electronic parking brake, suspension pressure, alarm, E-call, Electronic stability control




Wheel speed sensing, fuel level, seat position, belt presence, TPMS, fuel vapor




Battery management sensor, wing mirror position, steering wheel angle, torque



Automotive Application



Application	Keyless Entry Antenna, 125kHz 	DC Motors EMI 	TPMS, 125kHz 
Shape	Long flat bar core	Rod core	Rod, bone core
Material	P4, P41, P47	H5, D28, H5R	D28, F52

Application	3D Antenna(key side), 125kHz 	Immobilizer, 125kHz 	Controller Area Network (CAN)-BUS filter 
Shape	Drum, Rod core	Rod core	Toroid
Material	K10, F52	H5M, D28	D27, K081

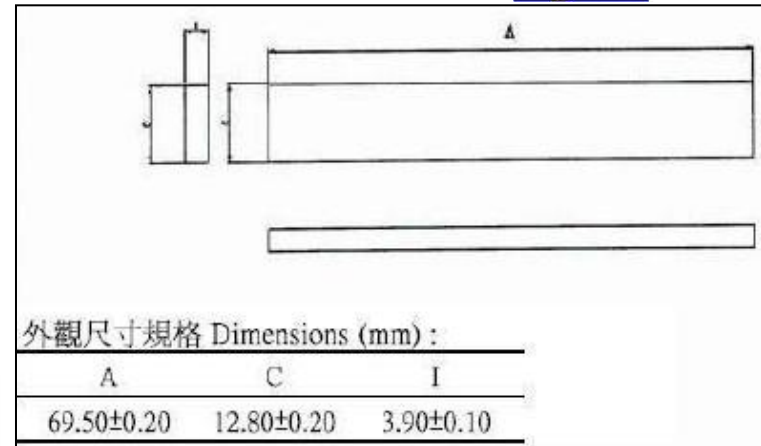
Application	Automotive Airbag Connectors (EMI Suppression Ferrites) 	Electric Power Steering(EPS) Torque Angle Sensor Power 	HID Ballast Transformers 	Battery Charger 
Shape	RH, RID	Mushroom	I cores	PQ, RM, EP
Material	D28, D40	P41	H5M	MnZn

Remote keyless entry system Car antenna

Low frequency antenna (125 kHz) used to establish the communication with the key antenna

Product type: long flat bar core (up to 90 mm)

Material: ACME P4, P41,





Key Applications

- *DC Motors (Cooling Fans, Wipers, Power Seats, Windows, Sun Roofs etc)*
- *Spark Plug Ignition Coils*
- *Antennas For Keyless Entry Systems*
- **Shape: Rod**
- **Material: H-5, H5R, D28**
- **Capacity: 40 Million pieces per month**





Tire pressure monitoring system (TPMS)

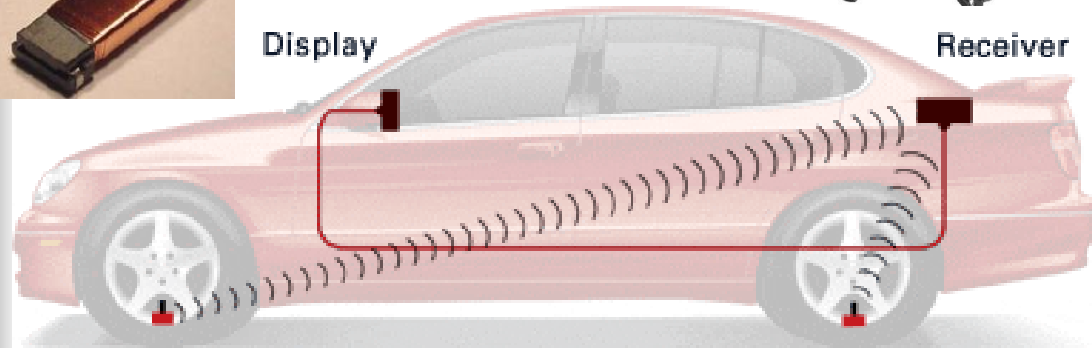
Low frequency antenna (125 kHz) collecting energy to power the pressure monitoring electronics. Designed to withstand the harshest mechanical shock and high temperatures. AEC-Q200 Grade 1 (-40°C to +125°C). Temperature coefficient of inductance: +300 to +1100 ppm/°C

- Product type: small SMD robust core
- Material: ACME D28,
- Customers: ACME KASCHKE,
- Potential customers: Coilcraft, Sumida, Kaschke, Neosid, Kyocera, Toko.
- Comments: key parameter is mechanical reliability due to the harsh environment.
- Around one million pcs have been shipped out during from MA Jan-Apr 2013



Display

Receiver



TPMS Sensor

TPMS Sensor

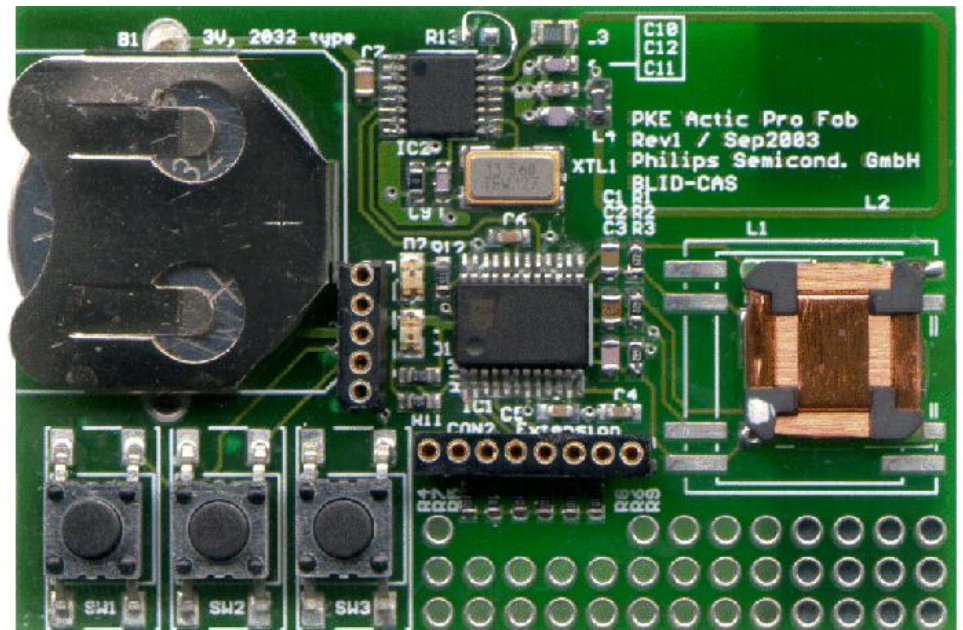
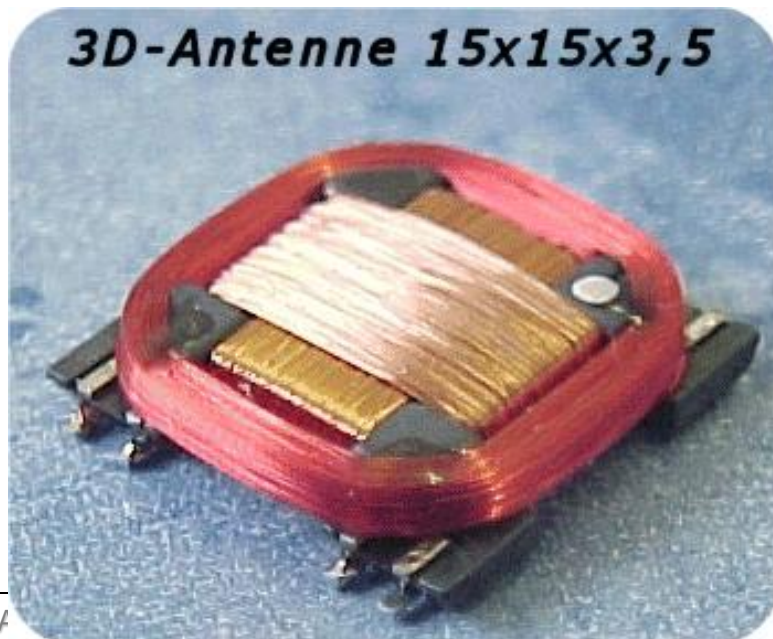
3D Antenna



Low frequency antenna to wake up the driver key when the driver approaches the car

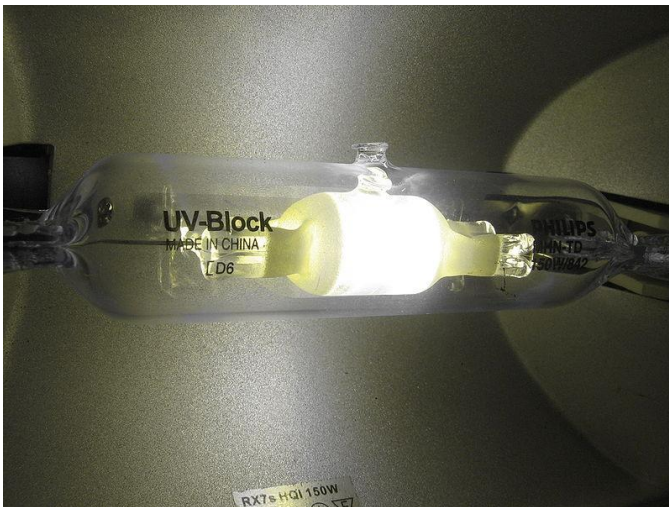
Product type: complex shape wound on 3 axis, or combination of 3 antennae, one for each axis.

- Material: ACME K10,
- Customers: TDK, PREMO
- Potential customers: Sumida, Murata,



Key Applications

- *Ferrites for HID Balasts Transformers used in Automotive Lighting Systems*
- **Shape:** *UI & Plate*
- **Material:** *H5M*
- **Capacity:** *2 Million pieces per Month*



Key Applications

ANIMAL TRACKING



Livestock



Pets



Wildlife

AUTOMOTIVE



Keyless Entry



TPMS



Immobilizer

COMMERCIAL



Logistics



Access Control



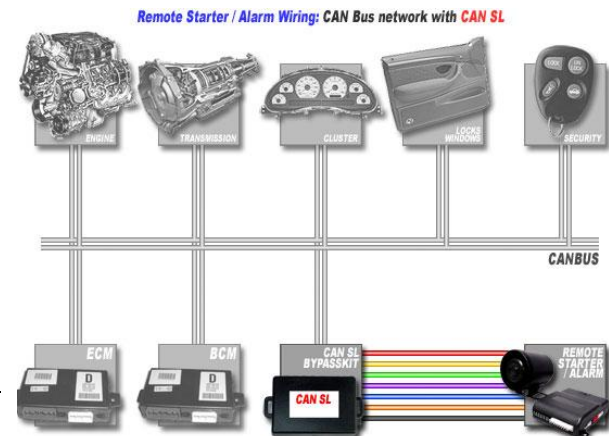
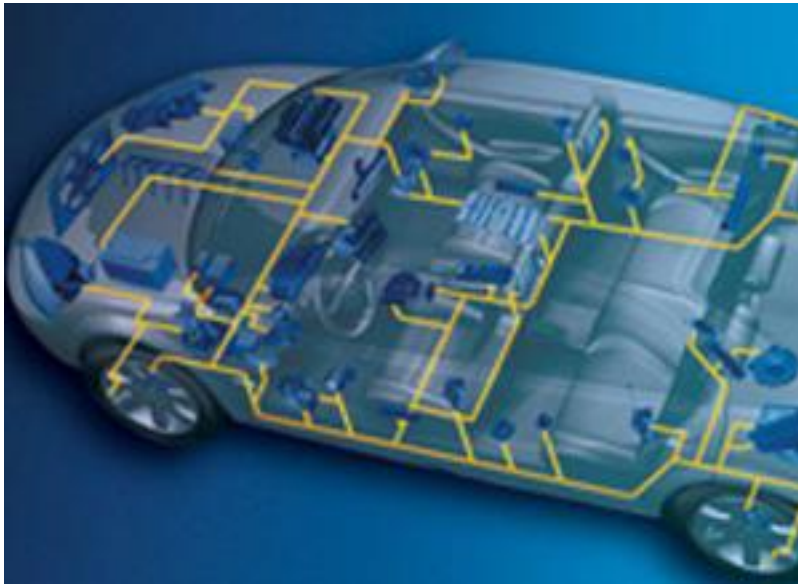
Medical Applications

- *Animal Tagging (Livestock, Pets)*
- *Automotive (Keyless Entry / Go, Tire Pressure Monitoring System, Immobilizer)*
- *Commercial (Freight Management, Access Control)*
- *Medical Applications (Heart Rate Monitor, Body Transponder)*



Key Applications

- *Ferrites for CAN Bus Systems used in Automotive Control Systems (Drive by Wire, Engine Control Modules)*
- **Shape:** Toroid
- **Material:** D27
- **Capacity:** 10 Million pieces per Month



Key Applications



- *EMI Suppression Ferrites for Automotive Airbag Connectors*
- **Shape:** RH & RID
- **Material:** D28, D40
- **Capacity:** 6 Million pieces per Month

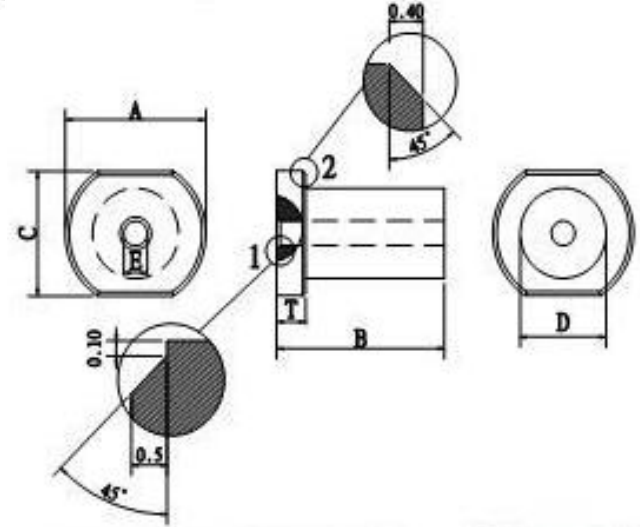
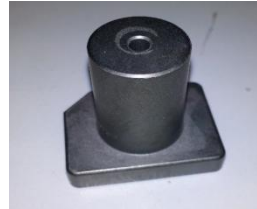
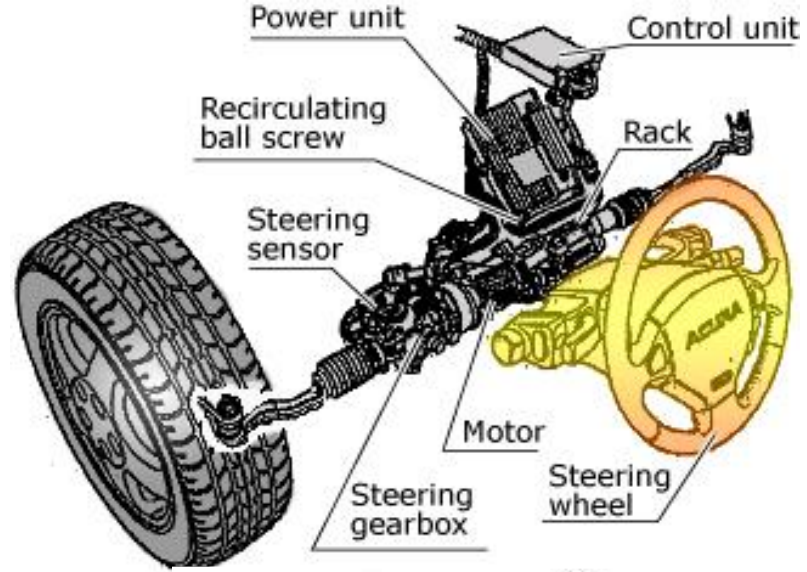
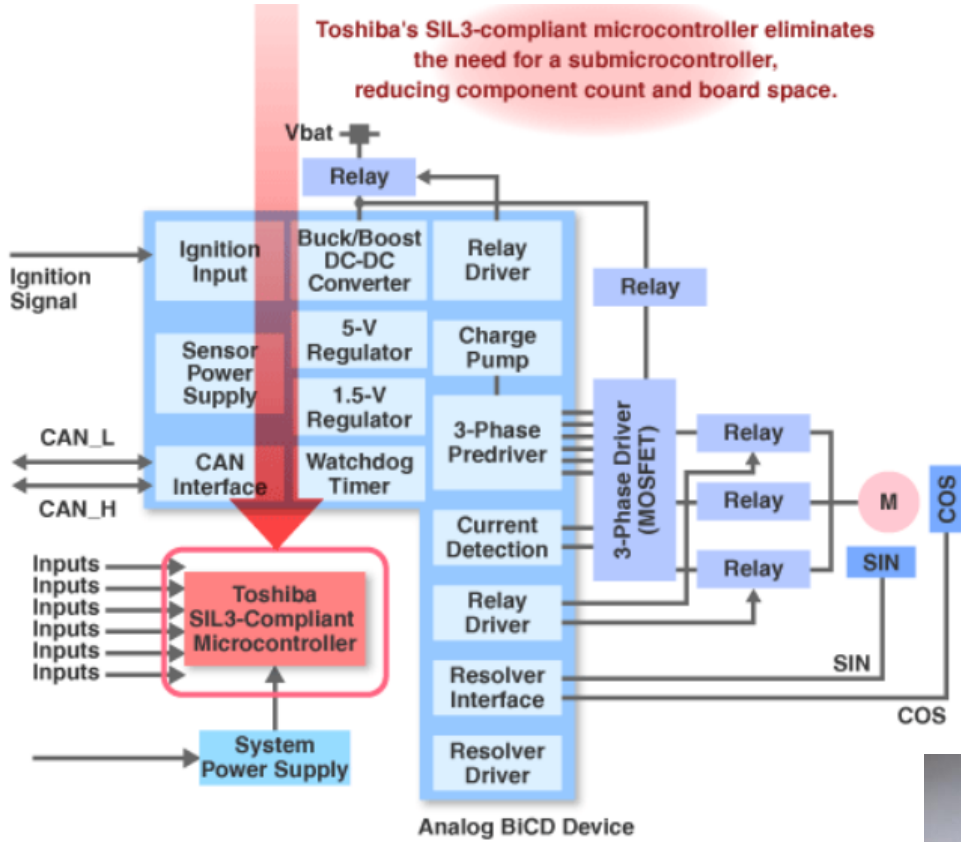


Ferrite in EPS



Electric Power Steering (EPS)

Toshiba's SIL3-compliant microcontroller eliminates the need for a submicrocontroller, reducing component count and board space.



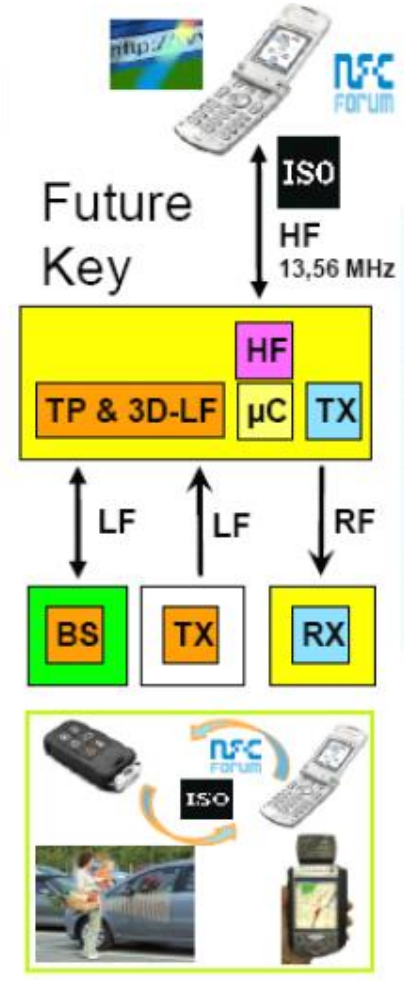
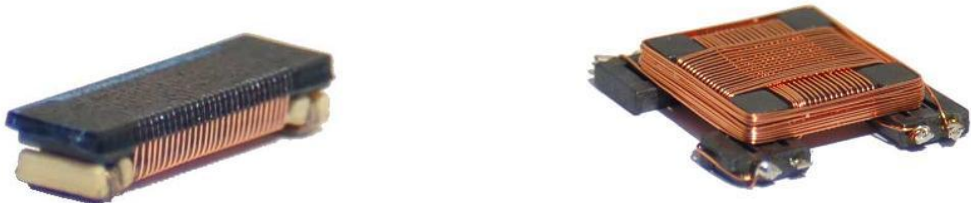
Ferrite for NFC



In the last few years, Communication technology by Near Field Communications (NFC) has experienced a lot of improvements.

A combination of 3 single coils oriented in the 3 space axis. Sensitivity, low profile and small size are the key of this RFID innovative component. Best choice for keyless entry systems the three tri-rectangular windings ensure optimum field sensing regardless position.

Size: 17.5x16.0x4.0 mm
High stability in temperature (-40°C to +125°C).
Designed for 13,56MHz.



"Connected Key"

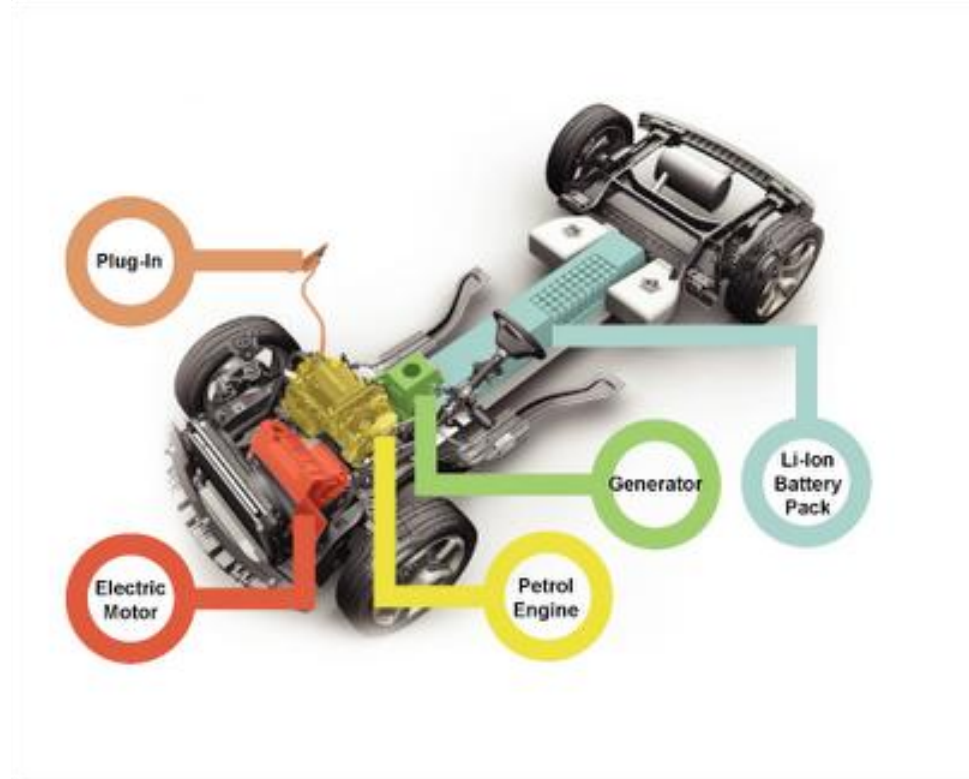
>2010

On board charger (OBC):

- Battery charger:
 - **Boost choke**
 - EMI filter (CMC)
- **Inverter (to power the engine):**
 - Output choke
 - **EMI filter**
- Buck choke for 12V systems

Off board: charger

- Output choke and filter
- **Induction charger**



Systems of the Automotive – Hybrid & eCar

Battery charger 3.3 kw standard

EMC filter: Common mode choke for low and high frequency suppression.

Toroids in high permeability (A05-A10) and NiZn (K081, B series)

Power Factor Corrector: cleans harmonics and converts AC to DC

Low profile power shapes (planar, PQ) in P45, P48

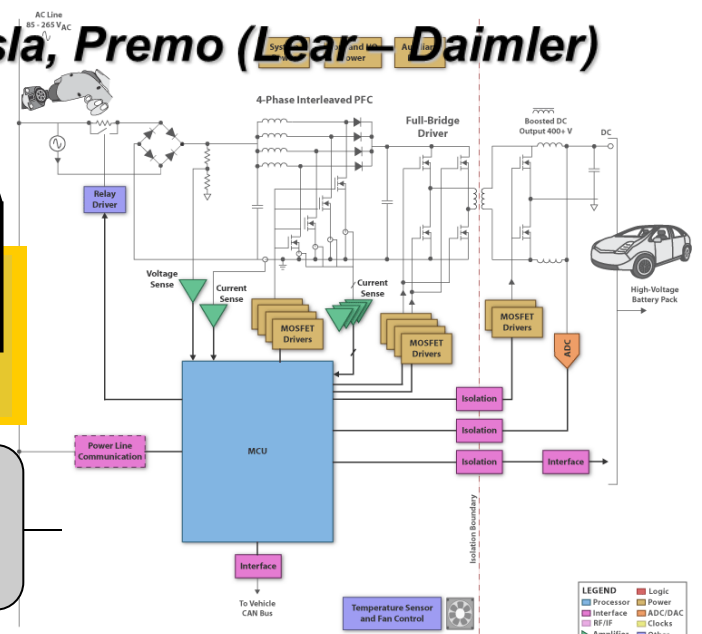
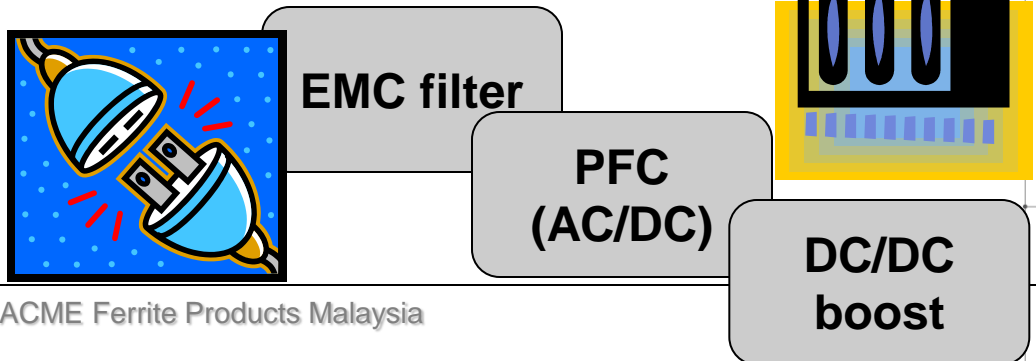
DC/DC boost converter (to 400 V) for battery charging.

Low profile power shapes with high efficiency for:

- transformers in P52, P45, **P45+**
- Output chokes in P42, P49

Customers: BWM i3, Delta (Chevy Volt), Tesla, Premo (Lear – Daimler)

Market: emerging market.



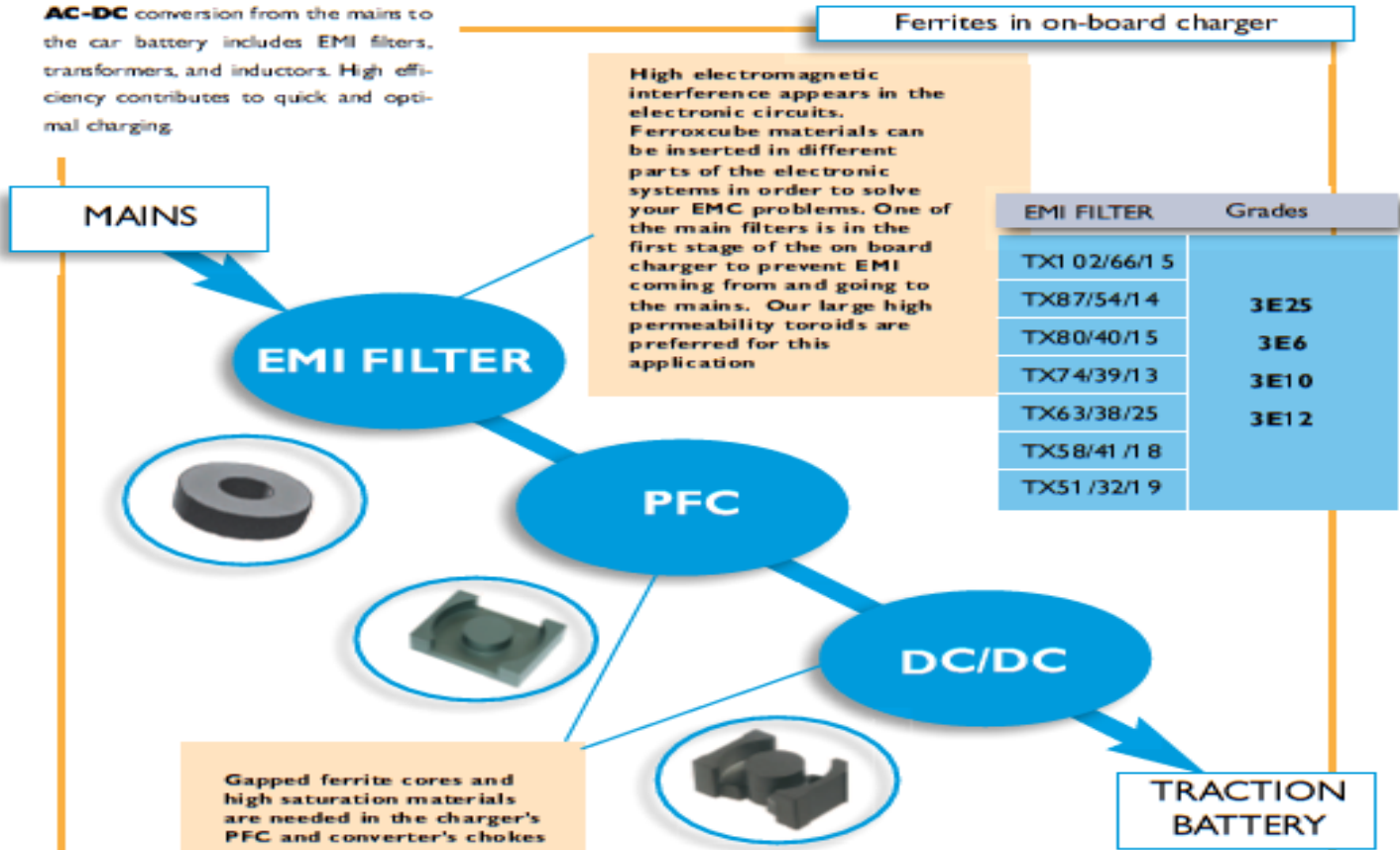
LEGEND

Processor	Logic
Interface	Power
RF/F	ADC/DAC
Amplifier	Clock
Other	Other

Systems of the Automotive – Hybrid & eCar

On board charger

AC-DC conversion from the mains to the car battery includes EMI filters, transformers, and inductors. High efficiency contributes to quick and optimal charging.



Ferrites in on-board charger

High electromagnetic interference appears in the electronic circuits. Ferroxcube materials can be inserted in different parts of the electronic systems in order to solve your EMC problems. One of the main filters is in the first stage of the on board charger to prevent EMI coming from and going to the mains. Our large high permeability toroids are preferred for this application

Gapped ferrite cores and high saturation materials are needed in the charger's PFC and converter's chokes

EMI FILTER	Grades
TX1 02/66/1 5	3E25 3E6 3E10 3E12
TX87/54/1 4	
TX80/40/1 5	
TX7 4/39/1 3	
TX6 3/38/25	
TX58/41 /1 8	
TX51 /32/1 9	

Shapes ¹							Grades ¹
EQ1 3	EQ20	EQ25	EQ30	PQ26/20	PQ32/20	PQ35/35	3C92, 3C94, 3C95, 3C96, 3C97, 3F3, 3F35
RM1 0/l	RM1 2/l	RM1 4/l	E22/x/1 6 ⁽²⁾	E32/x/20 ⁽²⁾	E38/x/25 ⁽²⁾	E43/x/28 ⁽²⁾	
E58/x/38 ⁽²⁾	E64/x/50 ⁽²⁾	ER23/x/1 3 ⁽²⁾	ER32/x/25 ⁽²⁾	ER41 /x/32 ⁽²⁾	ER51 /x/38 ⁽²⁾	ER64/x/5 ⁽²⁾	

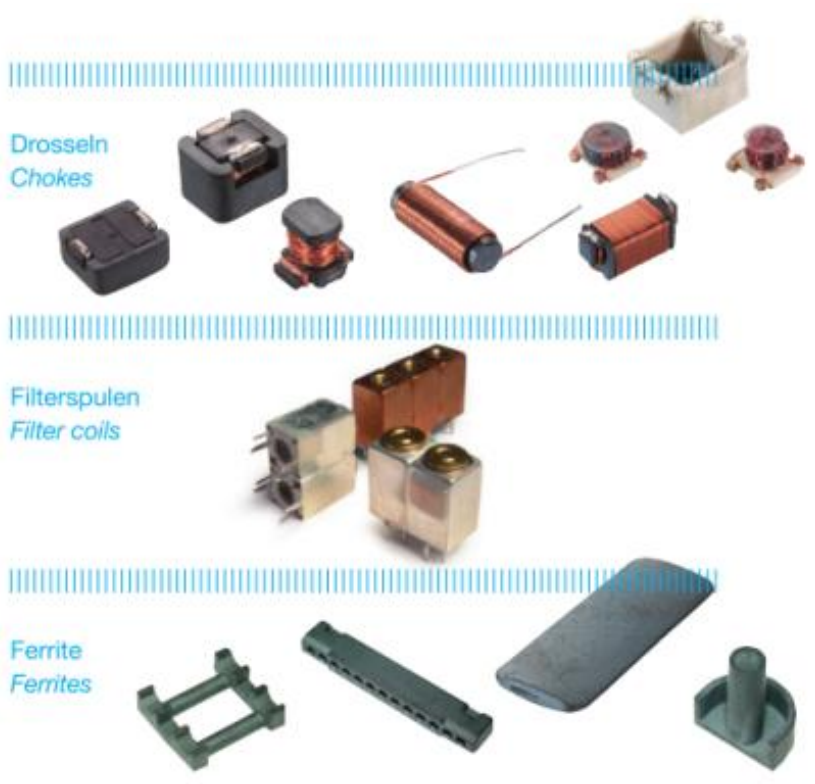
Top 5 of Automotive Tier 1 Suppliers



Ferrite Injection Molding



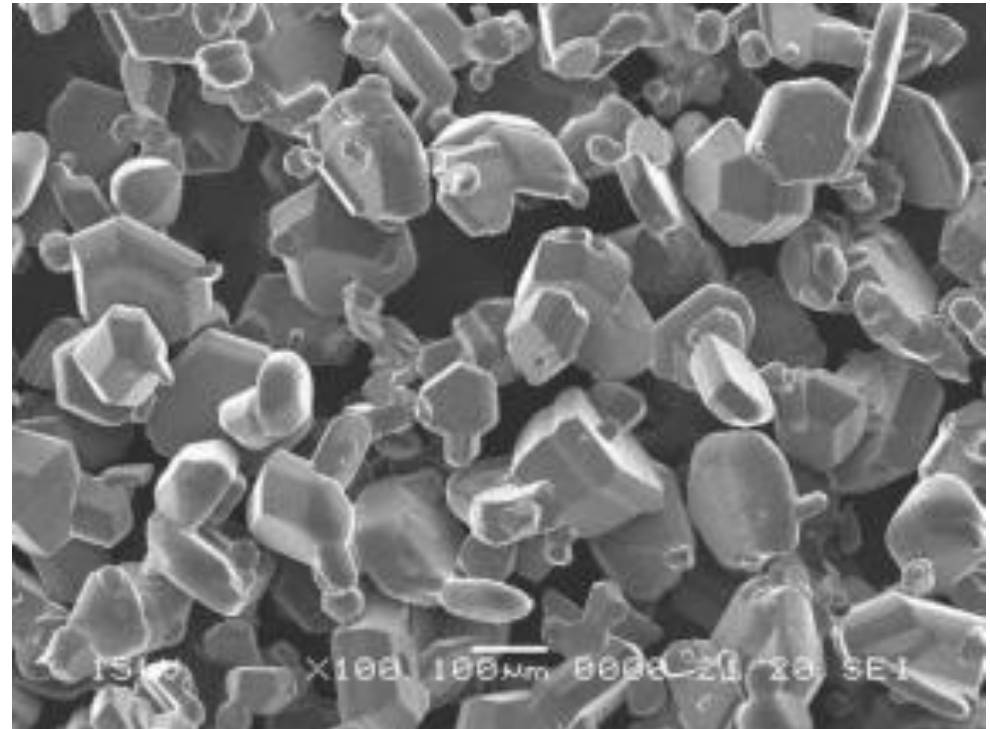
- ACME's CIM technology for complex shape products.
- Many of our key customers increasingly complicate the design of inductors or transformers.



Ferrite Injection Molding

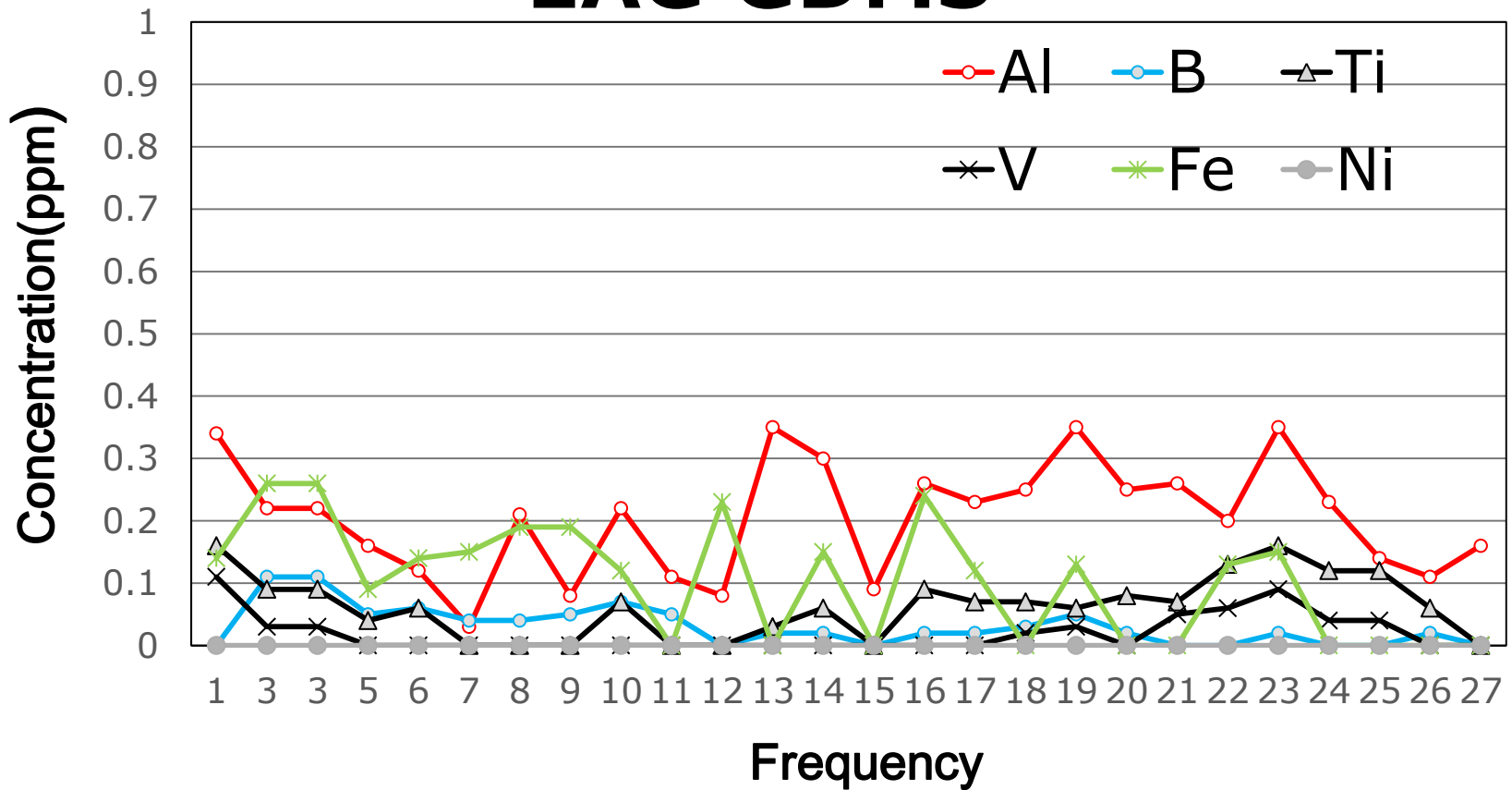


High Purity SiC Powder



Purity: The total impurity of 15 elements below 1 ppm

EAG GDMS



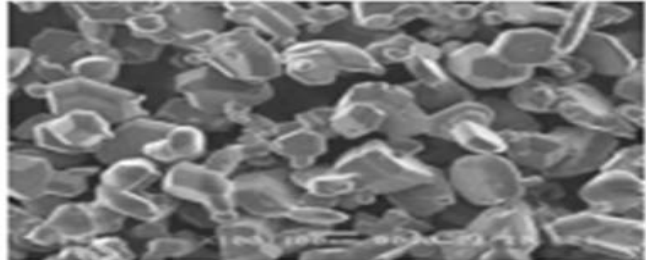
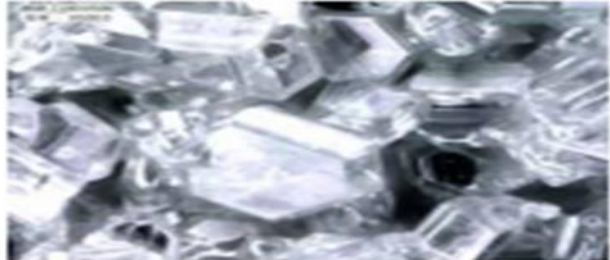
ACME Typical Physical Characteristics:

Characteristics	Unit	Typical Value		Analysis Method
		ASH1-6S	ASH2-6S	
Particle Size(D50)	µm	300 ± 50 µm	500 ± 50 µm	Laser Diffraction
Total Nitrogen	ppm	<25 (Typical value)		IGA (Instrumental Gas Analysis)
Total Oxygen	ppm	<100 (Typical value)		IGA
Apparent Density	g/cm ³	1.3 ± 0.3		

SiC Powder Product-N type



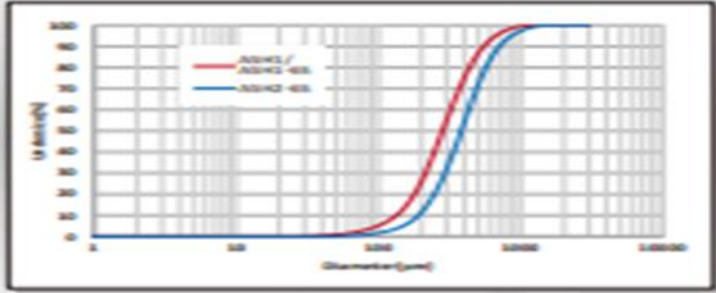
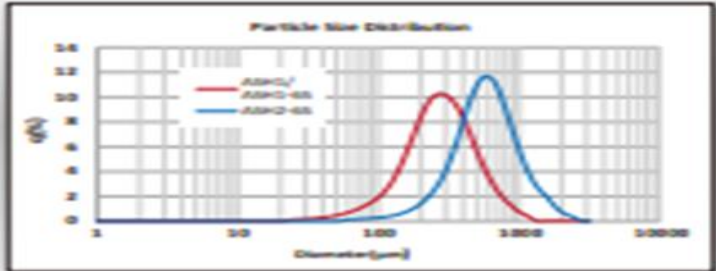
- ▶ ACME's High Purity SiC powders manufactured via Eco-friendly and low energy consumption processes.
- ▶ Nitrogen (N) content around 5 ppm as well as good particle size distribution for ideal SiC single crystal growth.



SiC Powder Characteristics

Characteristics	Unit	Spec.	
		ASH1/ ASH1-6S	ASH2-6S
Grain Size (D50)	mm	0.3	0.5
Typical Trace Elements			
B	ppm	< 1	< 1
Na	ppm	< 1	< 1
Mg	ppm	< 1	< 1
Al	ppm	< 1	< 1
P	ppm	< 1	< 1
Fe	ppm	< 1	< 1
Ca	ppm	< 1	< 1
Co	ppm	< 1	< 1
Cr	ppm	< 1	< 1
Cu	ppm	< 1	< 1
K	ppm	< 1	< 1
Ni	ppm	< 1	< 1
Ti	ppm	< 1	< 1
W	ppm	< 1	< 1
V	ppm	< 1	< 1
Purity	%	> 99.9999	
Packing Density	g/cm ³	> 1.3	

SiC Powder Particle Distribution



SiC Powder Product-Semi-Insulating



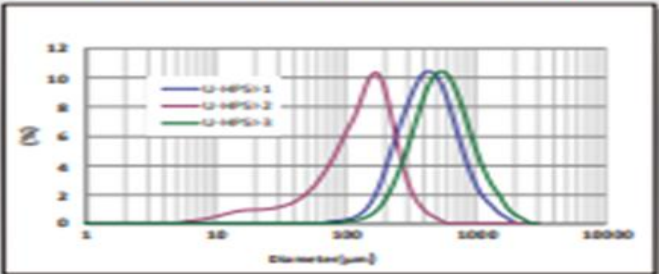
- ▶ ACME's High Purity SiC powders manufactured via Eco-friendly and low energy consumption processes.
- ▶ Nitrogen (N) content < 1 ppm as well as good particle size distribution for ideal Semi-insulating SiC single crystal growth.



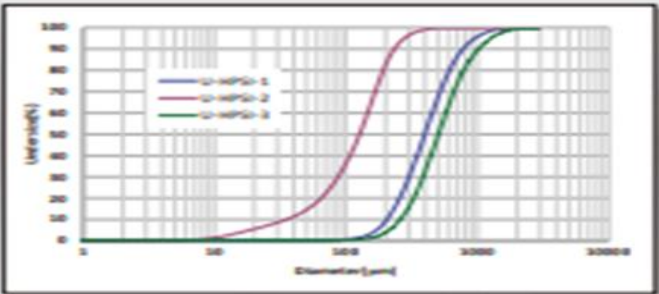
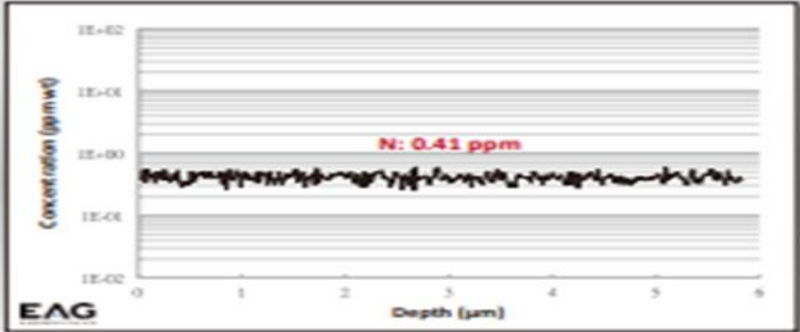
Semi-insulating SiC Powder Characteristics

Characteristics	Unit	Spec.		
		U-HPSI-1	U-HPSI-2	U-HPSI-3
Grain Size (D50)	µm	450	120	500
Packing Density	g/cm ³	1.1	1.2	1.4
Purity	%	> 99.9999		

SiC Powder Particle Distribution



N Concentration in SiC Powder Analysis Using SIMS

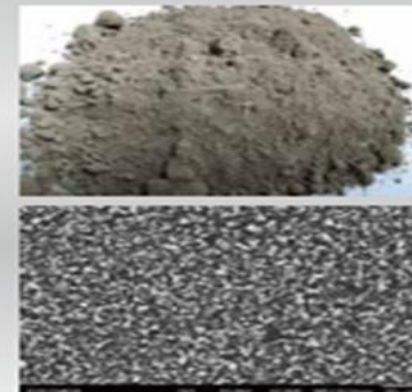
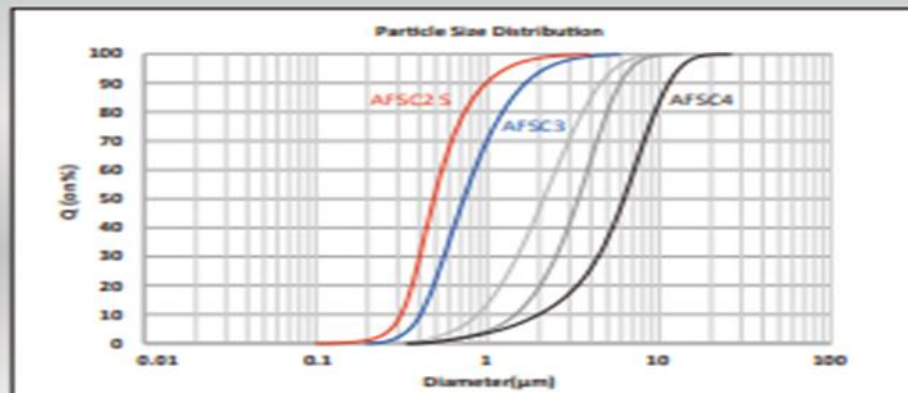


SiC Powder Product- Ceramics

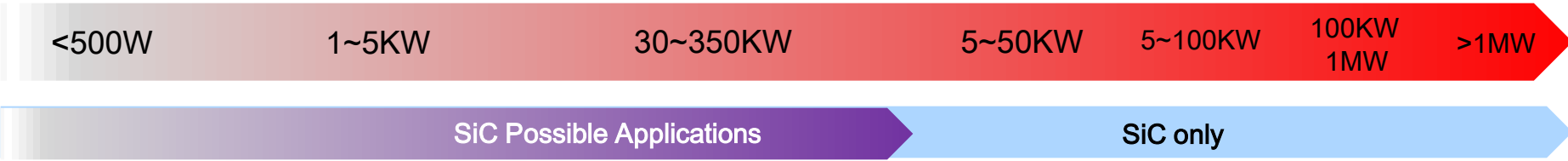
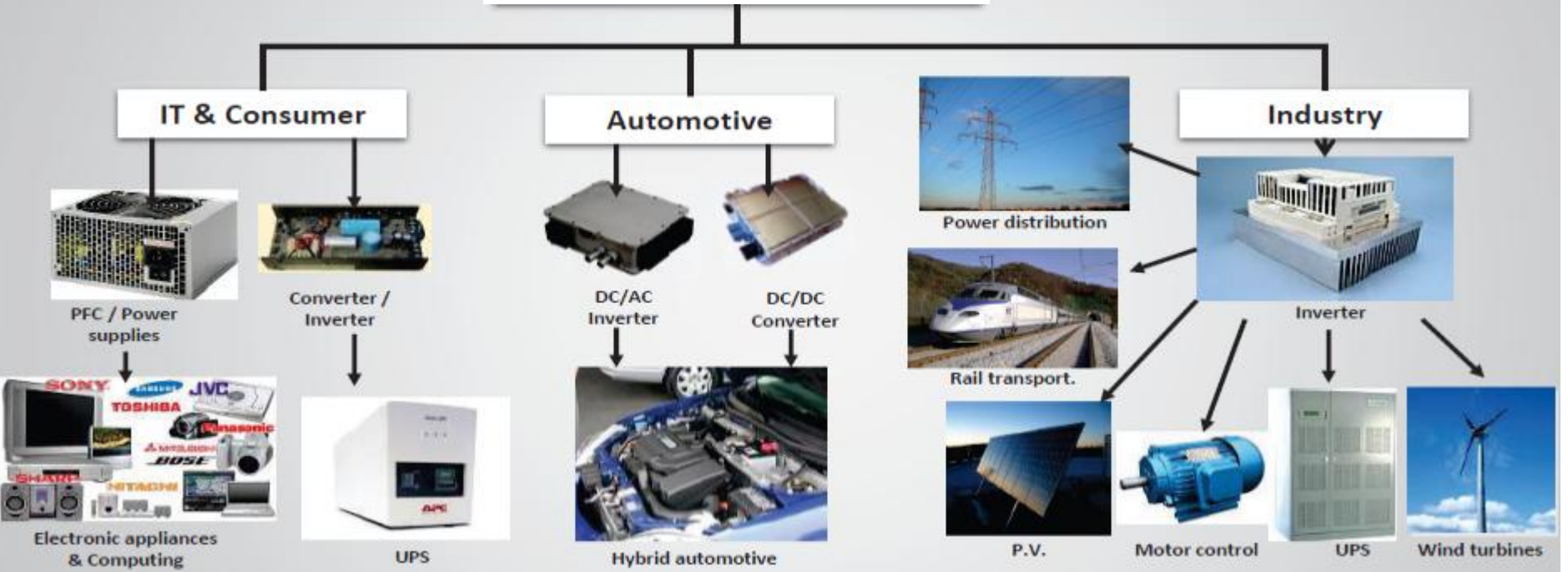
- ▶ AFSC series fine and high purity SiC powder.
- ▶ Ceramic parts for applications where very low contamination is allowed such as all kinds of vacuum equipment in semiconductor & LED industries.
- ▶ Materials with excellent morphology and particle size distribution for ceramic grinding applications.
- ▶ High purity ultrafine powder suitable for surface coating and porous structure applications.

Typical Characteristics

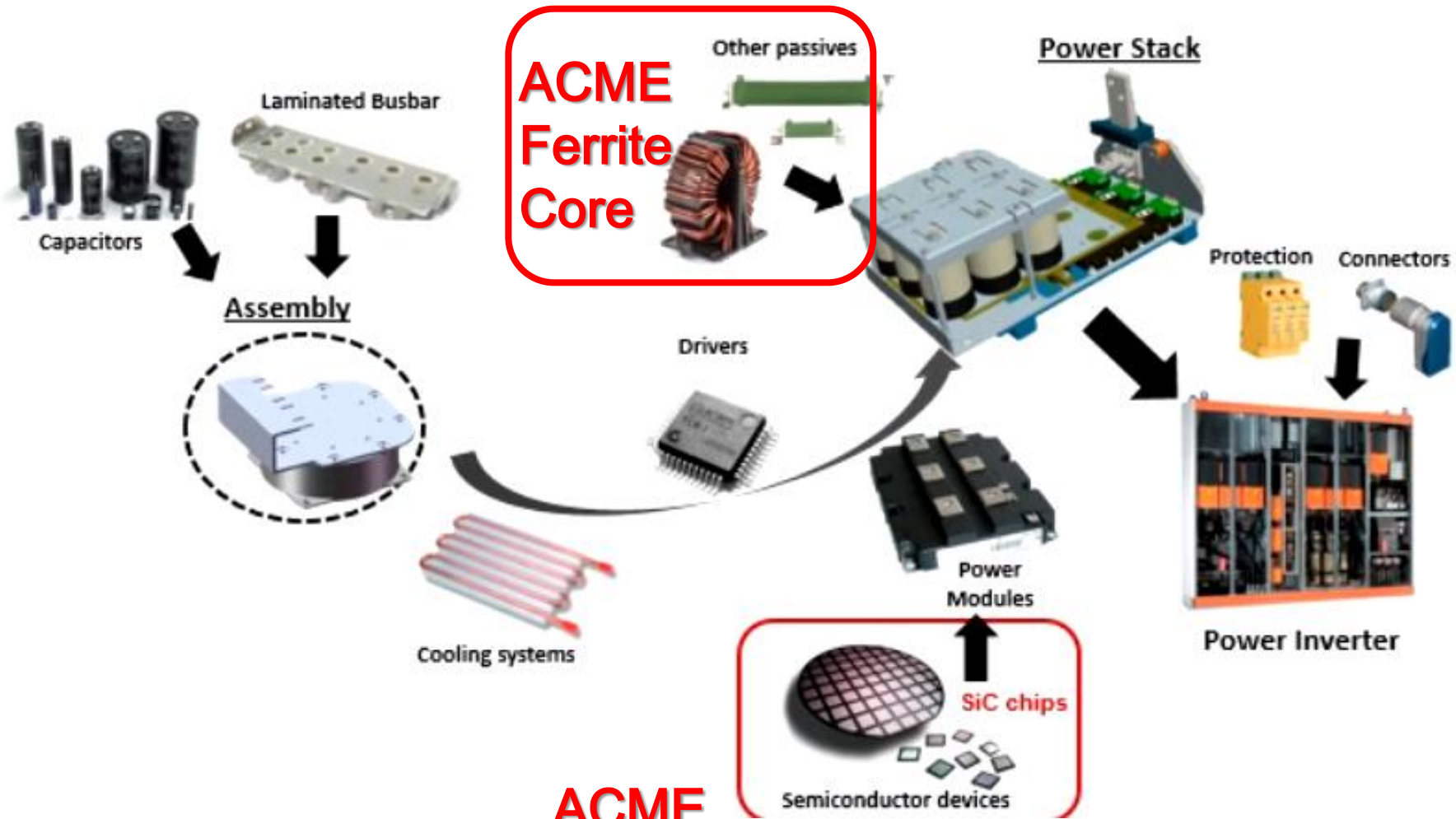
Product		Unit	AFSC4	AFSC3	AFSC2S	Remarks
Particle Size (D50)		μm	1-6	0.7	0.5	Particle Size by Laser Analyzer
Purity	Elements					
	SiC	%	≥99.99	≥99.90	≥99.00	
	Al	%	0.001	0.001	0.001	GDMS
	Fe	%	0.01	0.05	0.60	
	Ni	%	0.01	0.05	0.05	
	Ca	%	0.001	0.001	0.001	
	Ti	%	0.001	0.001	0.001	
V	%	0.001	0.001	0.001		
Na	%	0.001	0.001	0.001		
Bulk Density		g/cm ³	0.8	0.4	0.4	Apparent density



SiC displace Silicon



SiC Application-Power System Value Chain



ACME
SiC Powder

Key Customers





OUR POLICY

- **TOTAL CUSTOMER SATISFACTION**
- **Maintain Spirit of Excellence in all activities**
- **Provide a challenging and creative work environment**
- **Maintain ISO-9001 & ISO14001 quality system**



ISO-9001:2000

ISO-14001

CERTIFICATED NO. FM 38875



ACME Electronics Corporation

Aggressively Committed to Manufacturing Excellence