



# **China New Energy Vehicle Power Electronics Industry Report, 2018-2022**

**January 2019**

## **STUDY GOAL AND OBJECTIVES**

This report provides the industry executives with strategically significant competitor information, analysis, insight and projection on the competitive pattern and key companies in the industry, crucial to the development and implementation of effective business, marketing and R&D programs.

## **REPORT OBJECTIVES**

- ◆ To establish a comprehensive, factual, annually updated and cost-effective information base on market size, competition patterns, market segments, goals and strategies of the leading players in the market, reviews and forecasts.
- ◆ To assist potential market entrants in evaluating prospective acquisition and joint venture candidates.
- ◆ To complement the organizations' internal competitor information gathering efforts with strategic analysis, data interpretation and insight.
- ◆ To suggest for concerned investors in line with the current development of this industry as well as the development tendency.
- ◆ To help company to succeed in a competitive market, and

## **METHODOLOGY**

Both primary and secondary research methodologies were used in preparing this study. Initially, a comprehensive and exhaustive search of the literature on this industry was conducted. These sources included related books and journals, trade literature, marketing literature, other product/promotional literature, annual reports, security analyst reports, and other publications. Subsequently, telephone interviews or email correspondence was conducted with marketing executives etc. Other sources included related magazines, academics, and consulting companies.

## **INFORMATION SOURCES**

The primary information sources include Company Reports, and National Bureau of Statistics of China etc.

## Abstract

New energy vehicle electronic technologies generally include battery management system (BMS), on-board charger, inverter, vehicle control unit/hybrid control unit (VCU/HCU), pedestrian warning system and DC/DC. Thereof, core parts like BMS, inverter (motor control unit) and VCU must be very safe and reliable. New energy vehicle power electronics can be divided into on-board charger (AC-DC), inverter (DC-AC) and DC-DC, as well as air-conditioner compressor motor controller, electric air conditioner heater (PTC), among others.

In 2017, China's EV motor controller market size ranged at RMB12.9 billion, and passenger car motor controller market expanded in size. It is predicted that boosted by new energy passenger car and hybrid vehicle markets, EV motor controller market will be worth RMB36.1 billion in 2022, and passenger car will play a dominant role.

China-made on-board charger (OBC) is priced at RMB1,000-4,500/unit for the moment. The larger power it is, the higher price will be. OBC falls into three types by power: <2.5KW, 3-5KW (mostly 3.3KW), and >6KW, respectively for EVs with battery capacity less than 15kWh, 15-24kWh electric passenger cars and small logistics vehicles, and 24kWh-above electric commercial vehicles and logistics vehicles. Market price of 6.6KW charger stands at RMB3,500-4,500, 3.3KW at RMB1,500-2,000 and 2KW at around RMB1,000.

Large power OBC is growing a trend as individual users and ride-hailing firms require far shorter charging time. 6.6KW OBC will win popularity; 10KW-23KW large power ones will find wider application. By RMB3,500 per unit, the OBC market size will be RMB7 billion in 2020; the DC/DC market will be valued at a staggering RMB3 billion in 2020 as long as the price of DC/DC converter is kept at RMB1,500.

### Technology trends:

Passenger car generally has the voltage of 300-400V and will develop towards high voltage in the upcoming five years because of a demanding both on power and super charging. Accordingly, inverter design will extend from 650V IGBT design to 750V and 1,200V IGBT. In the next five to ten years, SiC IGBT chip will get massively utilized in motor controllers (inverters). SiC devices can cut down switching losses significantly, improve system efficiency, reduce dead time, and enhance system output capability. The total cost of battery packs and controllers can drop by 5%, and the mileage range can rise by 10%. Tesla is the first automaker to integrate a full SiC power module in its Model 3. Thanks to its collaboration with STMicroelectronics, the Tesla inverter is composed of 24 1-in-1 power modules assembled on a pin-fin heatsink.

High integration facilitates the spatial layout of the vehicle. In the limited space of new energy vehicles (especially passenger cars), the power and electronic integration technologies are used to integrate the automotive power supply with either motor controllers or electronic control system components such as the high-voltage power distribution boxes in a bid to reduce the space occupied by the automotive power supply, lowering the manufacturing cost and lifting the power density. This has become the development direction of the automotive power supply products.

Bidirectional DC/DC transmission is anticipated to gain ground as it can be used for braking energy recovery, auxiliary battery/capacitor charging and discharging, and high/low-voltage energy conversion of 48V micro-hybrid models. Bidirectional DC/DC solutions are more efficient, less occupied and more affordable than the reverse parallel of 2 unidirectional DC/DC converters, typically finding application in Toyota Prius.

The report highlights the following:

- ◆ Overview of new energy vehicle (NEV) power electronics, including definition, classification, industrial chains;
- ◆ Environments for new energy vehicle (NEV) power electronics industry, including policy climate, development of NEV market and its influence on the NEV power electronics industry;
- ◆ China-made NEV power electronics, including drive motor controllers, DC/DC converters, onboard chargers (industrial chains, cost analysis, business models, competitive landscape, leading manufacturers, as well as the competitive pattern of power electronics for passenger car and commercial vehicle); and analysis on automotive power electronics technologies and development tendencies;
- ◆ Five Chinese DC/DC and onboard charger companies, twenty-two Chinese motor controller manufacturers, eight global motor controller companies, and six global IGBT vendors (operation, development strategy, supply chain, NEV power electronics business, etc.);
- ◆ EV motor controller industry policy, market size, supply chain and competitive landscape as well as the world's popular EV motors and electric control systems.

**1 Overview of Automotive Power Electronics**

- 1.1 Overview
- 1.2 Motor Controller (Inverter)
  - 1.2.1 Fundamentals
  - 1.2.2 Product Classification
  - 1.2.3 Technology Roadmap
  - 1.2.4 Technology Trends
- 1.3 DC-DC Converter
  - 1.3.1 Product Classification
  - 1.3.2 Technology Trends
  - 1.3.3 Technical Evaluation Indicators
  - 1.3.4 Technical Difficulties and Industry Barriers
  - 1.3.5 Main Components and Cost Structure
- 1.4 On-board Charger (OBC)
- 1.5 IGBT Market and Development Trend
- 1.6 Summary

**2 EV Motor Controller Market**

- 2.1 Policy Environment
- 2.2 Market Size
- 2.3 Industry Profit
- 2.4 Supply Model
- 2.5 Competitive Landscape
- 2.6 Supply Relation among Enterprises in the World
- 2.7 Development of Major Enterprises

**3 EV DC/DC and Charger Market**

- 3.1 Market Size

- 3.2 Competitive Landscape
- 3.3 Technology Trends
  - 3.3.1 Integration
  - 3.3.2 DC/DC Two-way Transmission
- 3.4 Supply Relation among Enterprises in the World

**4 Major Chinese DC and Charger Enterprises**

- 4.1 Hangzhou EV-Tech Co., Ltd.
  - 4.1.1 Profile
  - 4.1.2 Operation
  - 4.1.3 Automotive DC/DC and Chargers
  - 4.1.4 Capacity
- 4.2 SHINRY Technologies Co., Ltd.
  - 4.2.1 Profile
  - 4.2.2 Automotive DC/DC and Chargers
  - 4.2.3 R&D and Technical Capability
  - 4.2.4 Production Bases and Capacity
- 4.3 Hangzhou Tiecheng Information Technology Co., Ltd.
  - 4.3.1 Profile
  - 4.3.2 Operation
  - 4.3.3 Automotive DC/DC and Chargers
  - 4.3.4 Technical Characteristics
  - 4.3.5 Production Bases and Capacity
- 4.4 Shijiazhuang Tonhe Electronics Technologies Co., Ltd.
  - 4.4.1 Profile
  - 4.4.2 Operation
  - 4.4.3 Automotive DC/DC and Chargers Business
  - 4.4.4 Technical Characteristics

- 4.4.5 Production Bases and Capacity
- 4.5 Luoyang Grasen Power Technology Co., Ltd.
- 4.5.1 Profile
- 4.5.2 Operation
- 4.5.3 Automotive DC/DC and Chargers Business

**5 Chinese EV Motor Controller (Inverter) Manufacturers**

- 5.1 Shanghai E-drive Co., Ltd.
- 5.1.1 Profile
- 5.1.2 Operation
- 5.1.3 EV Motor Controller Business
- 5.1.4 Technical Characteristics
- 5.1.5 Supply Chain Analysis
- 5.1.6 Business Expansion
- 5.2 Shenzhen Inovance Technology Co., Ltd.
- 5.2.1 Profile
- 5.2.2 Operation
- 5.2.3 Operation of and Development Strategy for EV Motor Controller Business
- 5.2.4 EV Motor Controllers and Technical Characteristics
- 5.2.5 Production Bases and Capacity
- 5.3 Shanghai Dajun Technologies, Inc.
- 5.3.1 Profile
- 5.3.2 Development History
- 5.3.3 Operation
- 5.3.4 Business Model
- 5.3.5 EV Motor Controllers and Technical Characteristics
- 5.3.6 Business in EV Field

- 5.3.7 Development Strategy in EV Field
- 5.4 Tianjin Santroll Electric Automobile Technology Co., Ltd.
- 5.4.1 Profile
- 5.4.2 EV Business
- 5.4.3 Main EV Power System Products and Technical Characteristics
- 5.4.4 Development Strategy in EV Field
- 5.5 Zhongshan Broad-Ocean Motor Co., Ltd.
- 5.5.1 Profile
- 5.5.2 Operation
- 5.5.3 EV Motor Controller Business
- 5.5.4 R&D
- 5.5.5 Development Strategy
- 5.5.6 Production Bases and Capacity
- 5.6 United Automotive Electronic Systems Co., Ltd. (UAES)
- 5.6.1 Profile
- 5.6.2 Production and R&D
- 5.6.3 EV Motor Controller Business
- 5.6.4 Production Bases and Capacity
- 5.7 Hunan CRRC Times Electric Vehicle Co., Ltd.
- 5.7.1 Profile
- 5.7.2 Operation
- 5.7.3 EV Controller Business
- 5.7.4 Dynamics of Drive System Business
- 5.7.5 Capacity
- 5.8 BYD
- 5.8.1 Profile
- 5.8.2 Operation
- 5.8.3 EV Motor Controller Business

5.9 Zhuhai Enpower Electric Co., Ltd.	5.13.1 Profile
5.9.1 Profile	5.13.2 Operation
5.9.2 Sales and Costs	5.13.3 Business in EV Field
5.9.3 Sales Model	5.14 Jing-Jin Electric Technologies (Beijing) Co., Ltd.
5.9.4 Major Customers	5.14.1 Profile
5.9.5 EV Motor Controllers	5.14.2 EV Controller Business
5.9.6 EV Motor Controller Business	5.15 DEC Dongfeng Electric Machinery Co., Ltd.
5.9.7 R&D	5.15.1 Profile
5.9.8 Production Bases and Capacity	5.15.2 EV Controller Business
5.10 Shenzhen V&T Technologies Co., Ltd.	5.16 Nidec (Beijing) Drive Technologies Co., Ltd.
5.10.1 Profile	5.16.1 Profile
5.10.2 Sales and Costs	5.16.2 Operation
5.10.3 Sales Model	5.16.3 EV Controller Business
5.10.4 Major Customers	5.17 Time High-Tech Co., Ltd.
5.10.5 EV Motor Controller Business	5.17.1 Profile
5.10.6 R&D	5.17.2 EV Controller Business
5.10.7 Production Bases and Capacity	5.18 JEE Automation Equipment Co., Ltd.
5.11 Fujian Fugong Power Technology Co., Ltd.	5.18.1 Profile
5.11.1 Profile	5.18.2 E-drive Products for Passenger Cars
5.11.2 External Cooperation	5.18.3 E-drive Products for Commercial Vehicles
5.11.3 NEV Drive Assembly Business	5.18.4 EV E-drive Business
5.11.4 Capacity Planning	5.19 Shandong Deyang Electronics Technology Co., Ltd.
5.12 Chroma ATE Inc.	5.20 Beijing Siemens Automotive E-Drive System Co., Ltd.
5.12.1 Profile	5.21 Prestolite E-Propulsion Systems (Beijing) Limited
5.12.2 Operation	
5.12.3 EV Motor Controller Business	
5.12.4 Development Strategy in EV Field	
5.13 Delta Electronics	

**6 Global Motor Controller (Inverter) Manufacturers**

6.1 Hitachi Automotive Systems


6.1.1 Profile

- 6.1.2 Operation
- 6.1.3 Business in EV Field
- 6.2 Mitsubishi Electric
  - 6.2.1 Profile
  - 6.2.2 Operation
  - 6.2.3 Business in EV Field
- 6.3 Meidensha
  - 6.3.1 Profile
  - 6.3.2 Operation
  - 6.3.3 Business in EV Field
- 6.4 Toshiba
  - 6.4.1 Profile
  - 6.4.2 Operation
  - 6.4.3 Business in EV Field
- 6.5 Hyundai Mobis
  - 6.5.1 Profile
  - 6.5.2 Operation
  - 6.5.3 Business in EV Field
- 6.6 Delphi
  - 6.6.1 Profile
  - 6.6.2 Operation
  - 6.6.3 Business in EV Field
- 6.7 Bosch
  - 6.7.1 Profile
  - 6.7.2 Operation
  - 6.7.3 Business in EV Field
- 6.8 Continental

**7 IGBT Suppliers**

- 7.1 Fuji Electric
  - 7.1.1 Profile
  - 7.1.2 Operation
  - 7.1.3 Business in EV Field
  - 7.1.4 Development Strategy in EV Field
- 7.2 Infineon
  - 7.2.1 Profile
  - 7.2.2 Operation
  - 7.2.3 Business in EV Field
  - 7.2.4 Development Strategy in EV Field
- 7.3 Denso
  - 7.3.1 Profile
  - 7.3.2 Operation
  - 7.3.3 Business in EV Field
- 7.4 ROHM
  - 7.4.1 Profile
  - 7.4.2 Operation
  - 7.4.3 Business in EV Field
- 7.5 IR
  - 7.5.1 Profile
  - 7.5.2 Operation
  - 7.5.3 Business in EV Field
- 7.6 Semikron
  - 7.6.1 Profile
  - 7.6.2 Operation
  - 7.6.3 Business in EV Field



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- Diagram for Battery Electric Vehicle Control System
  - Diagram for Hybrid Electric Vehicle Control System
  - Types of Energy Conversion Components and Power Devices
  - Types and Applicable Scope of Automotive Power Electronics
  - Battery Electric Vehicle-use Power Supply Architecture (IEEE 2015)
  - Hybrid Electric Vehicle-use Power Supply Architecture (IEEE 2016)
  - Principle of Electric Vehicle Motor Controllers
  - Drive Motor Controllers
  - Inverter Supply Relationship Diagram
  - Classification of EV Motor Controllers
  - Second-generation Prius-use IGBT Power Modules and Motor Controllers
  - Second-generation Prius-use IGBT Power Modules and Motor Controllers
  - Structure of Hitachi's First-generation Motor Controllers
  - Structure of Hitachi's Second-generation Motor Controllers
  - Hitachi's Double-sided Pin-Fin IGBT Modules and Third-generation Motor Controllers
  - Bosch's Third-generation Automotive IGBT Power Modules
  - Bosch's INV2CON Motor Controller
  - Bosch's INVCON2.3 Motor Controller
  - Continental's EPF2 Series Motor Controllers
  - Continental's New-generation Motor Controllers
  - SiC (left) and Si (right) Motor Controllers Developed by Toyota and Denso Jointly
  - Meidensha's SiC Motor Controller-Motor Integrators
  - DC-DC Converters
  - Schematic Diagram of DC-DC High and Low Voltage Converters
  - Schematic Diagram of DC-DC 12V Voltage Stabilizers


## Selected Charts

- 
- Schematic Diagram of DC-DC High Voltage Boosters
  - Typical Technical Parameters of DC-DC Converters
  - Onboard Charger Power of Different Models
  - Global IGBT Market Size, 2014-2018
  - China IGBT Market Size, 2014-2025E
  - China IGBT Industry Supply Chain
  - Technical Upgrading Roadmap of World's Key IGBT Vendors, 2017-2025E
  - Cost Ratio of Electric Vehicle Power Devices
  - Policies on EV Motor Controllers in China
  - Motor Drive and Power Electronic Technology R & D Goals and Tasks
  - China's EV Motor Controller Demand and Market Size, 2015-2022E
  - Motor Controller Gross Margin of Inovance Technology and V&T Technologies, 2012-2017
  - China's EV Motor Controller Supply Modes
  - Market Share of Major Electric Passenger Car Motor Controller (Inverter) Manufacturers in China, 2016
  - Market Shares of Leading Manufacturers of Motor Controllers for Electric Passenger Cars in China, 2016
  - Market Shares of Leading Manufacturers of Motor Controllers for Electric Passenger Cars in China, 2017
  - Top 10 Motor Controller Manufacturers' Installations to Electric Passenger Cars in China, 2017
  - Top 10 Motor Manufacturers' Installations to Electric Passenger Cars in China, 2017
  - Motor and Controller Suppliers of Major Electric Bus Companies in China
  - Motor and Controller Suppliers of Major Passenger Car Companies in China
  - Inverter Supply of Some Vehicle Models Worldwide
  - Developments of Major EV Motor Control Manufacturers in China
  - China's DC/DC Converter and Automotive Charger Market Size, 2016-2020E
  - Automotive DC/DC Market Shares in China, 2017
  - Automotive OBC Market Shares in China, 2017

## Selected Charts

- 
- DC-DC Converter (Automotive Charger) Companies and Supporting Situation
  - Automotive Power Supply Integration Solutions
  - Bidirectional Chargers Launched by Automakers and Parts Companies
  - Chinese Suppliers of Automotive DC/DC and Onboard Charger and Supply Relation
  - Foreign Suppliers of Automotive DC/DC and Onboard Charger and Supply Relation
  - High-voltage 'Electric Control' Integration Technology Hierarchies of SHINRY Technologies
  - High-voltage 'Electric Control' Integration Technology Roadmap of SHINRY Technologies
  - Manufacturing Bases and R&D Layout of SHINRY Technologies
  - Overview of SHINRY Technologies' Investment Projects with Raised Funds via IPO
  - Revenue and Profit of Shijiazhuang Tonhe Electronics Technologies, 2014-2018Q1-Q3
  - Revenue of Shijiazhuang Tonhe Electronics Technologies by Business, 2015-2018H1
  - Key Customers for Vehicular Power Supply of Shijiazhuang Tonhe Electronics Technologies
  - Equity Structure of Shanghai Edrive (before/after Acquisition)
  - Operating System of Shanghai Edrive (after Acquisition)
  - Major Customers of Broad-Ocean Motor and Shanghai Edrive
  - Financial Indicators of Shanghai Edrive, 2009-2017
  - Main Products of Shanghai Edrive
  - Production Base Construction of Shanghai Edrive
  - Electric Vehicle Drive Motor System Shipment of Shanghai Edrive, 2013-2017
  - Core Patented Technologies of Shanghai Edrive
  - Revenue and Net Income of Inovance Technology, 2009-2018Q1-Q3
  - Gross Margin of Inovance Technology, 2011-2018Q1-Q3
  - Revenue of Inovance Technology by Product, 2012-2018H1
  - Gross Margin of Inovance Technology by Product, 2013-2018H1
  - Automotive Electronics Customers of Inovance Technology

- 
- Plug-in Hybrid Electric Bus System Solutions of Inovance Technology
  - Main EV Motor Controllers and Applications of Inovance Technology
  - Motor Controller Technology Roadmap of Inovance Technology, 2014-2020E
  - Performance of Shanghai DAJUN Technologies, 2012-2017
  - Main Materials Purchased by Shanghai DAJUN Technologies
  - Technical Parameters of N110WSA Motor Controller of Shanghai DAJUN Technologies
  - Technical Parameters of A360140J Motor Controller of Shanghai DAJUN Technologies
  - Motor Drive System Output and Sales Volume of Shanghai DAJUN Technologies, 2012-2017
  - Subsidiaries of Shanghai DAJUN Technologies
  - Equity Structure of Tianjin Santroll
  - Key Financial Indicators of Tianjin Santroll, 2014-2016
  - Revenue of Tianjin Santroll by Product, 2015-2016
  - IV-generation Plug-in Hybrid System Configuration of Tianjin Santroll
  - Battery Electric Time Share of China's Typical City Bus Cycle (CCBC)
  - Actual Operating Proportion of Battery Electric Bus 803 in Tianjin
  - 5th-generation Electronic Control Units of Tianjin Santroll
  - Equity Structure of Broad-Ocean Motor
  - New Energy Vehicle Powertrain Revenue of Broad-Ocean Motor, 2012-2017
  - 30KW Motor (YTD030W04) + Controller (KM6025W05) Drive Motor System of Broad-Ocean Motor
  - Ongoing New Energy Vehicle Electric Drive System Projects of Broad-Ocean Motor
  - New Energy Vehicle Market Layout of Broad-Ocean Motor
  - Ten-year Development Strategy of Broad-Ocean Motor
  - Distribution of UAES' Production Bases and R & D Centers
  - Overview of UAES' R & D Centers
  - Power Drive Product Lines of UAES

- 
- Overview of UAES' Electric Drive Test Equipment
  - Planning of UAES in Power Electronic Controllers
  - R & D Capability of UAES in Power Electronic Controllers
  - Structure and Specifications of UAES' Single Motor Control Products
  - Structure and Specifications of UAES' Double Motor Control Products
  - Financial Indicators of Hunan CRRC Times Electric Vehicle, 2011-2015
  - Motor Controllers of Hunan CRRC Times Electric Vehicle
  - BYD's Workforce, 2007-2017
  - Car Output and Sales Volume of BYD, 2010-2018
  - Revenue, Net Income and Gross Margin of BYD, 2009-2018Q1-Q3
  - BYD's Revenue Breakdown (by Product), 2007-2018H1
  - BYD's Gross Margin (by Product), 2008-2018H1
  - BYD's Revenue Breakdown (by Region), 2012-2018H1
  - Bidirectional Inversion Charging/Discharging Electric Drive Motor Controllers
  - BYD's Bidirectional Inversion Charging/Discharging Technology
  - BYD's Process Capability for Motor Controller
  - BYD's Key Production Lines and Equipment for Motor Controller
  - Revenue Breakdown of Zhuhai Enpower Electric Co., Ltd. by Product, 2013-2017
  - Main Raw Materials Procurement of Zhuhai Enpower Electric Co., Ltd., 2014-2016
  - Top 5 Suppliers and Procurement Breakdown of Zhuhai Enpower Electric Co., Ltd., 2016
  - Motor Controller Partners of Zhuhai Enpower Electric Co., Ltd.
  - Top5 Clients and Revenue Breakdown of Zhuhai Enpower Electric Co., Ltd., 2014-2016
  - Capacity, Output and Sales Volume of Zhuhai Enpower Electric Co., Ltd. by Product, 2014-2017
  - Average Price of Zhuhai Enpower Electric Co., Ltd.'s Motor Controllers, 2013-2017
  - R&D Projects of Zhuhai Enpower Electric Co., Ltd.

## Selected Charts

- Revenue and Net Income of Shenzhen V&T Technologies Co., Ltd., 2011-2018Q1-Q3
- Revenue Breakdown of Shenzhen V&T Technologies Co., Ltd. by Product, 2015-2018H1
- Procurement and Purchase Price of Main Raw Materials for Motor Controller of Shenzhen V&T Technologies Co., Ltd., 2012-2015Q1-Q3
- Product Sales Model of Shenzhen V&T Technologies Co., Ltd., 2011-2014
- Major Customers for New Energy Buses of Shenzhen V&T Technologies Co., Ltd.
- Major Customers for New Energy Dedicated Vehicle of Shenzhen V&T Technologies Co., Ltd.
- Average Unit Price of Shenzhen V&T Technologies Co., Ltd.'s EV Motor Controllers, 2012-2017
- EV Motor Controller Capacity and Utilization of Shenzhen V&T Technologies Co., Ltd., 2012-2015
- EV Motor Controller Sales Volume of Shenzhen V&T Technologies Co., Ltd., 2012-2017
- Shenzhen V&T Technologies Co., Ltd.'s Core Technologies for Motor Controller
- Main Partners of Fujian Fugong Engineering Technology Co., Ltd.
- Main Financial Indices of Fujian Fugong Engineering Technology Co., Ltd., 2014-Oct. 2015
- Architecture of CHS Dual-mode Hybrid System
- Diagram of Internal CHS Hybrid Transmission Case
- Auto Models with CHS Hybrid System
- Architecture of R&D Center
- Global Presence of Chroma ATE Inc.
- Financial Indices of Chroma ATE Inc. (Group's Consolidation), 2009-2017
- Chroma ATE Inc.'s Revenue Breakdown (by Division), 2016-2017
- CR Series Motor Controller Product Line of Chroma ATE Inc.
- Key Technical Parameters of Chroma ATE Inc.'s CR Series Motor Controller
- Financial Indices of Delta Electronics, 2009-2017
- Capacity, Output and Output Value (by Product) of Delta Electronics, 2015-2017
- Sales Volume (by Product) of Delta Electronics, 2016-2017

## Selected Charts

- Key R&D Equipment of Jing-Jin Electric Technologies (Beijing) Co., Ltd.
- Performance Parameters of PII Automotive Motor Controller of Jing-Jin Electric Technologies (Beijing) Co., Ltd.
- Performance Parameters of Four-in-one Automotive Motor Controller of Jing-Jin Electric Technologies (Beijing) Co., Ltd.
- EV Motor Controllers of DEC Dongfeng Electric Machinery Co., Ltd.
- New Energy Vehicle SRD Motor of Nidec (Beijing) Drive Technologies Co., Ltd.
- Battery Electric Power & Control System Assemblies of Time High-Tech Co., Ltd.
- EV Power Control System Composition Solution of Time High-Tech Co., Ltd.
- Key Technical Parameters of Time High-Tech Co., Ltd.'s EV Motor Controller
- Revenue of Hitachi Automotive Systems, FY2011-FY2015
- Global Footprints of Hitachi Automotive Systems
- Revenue Planning of Hitachi Automotive Systems by Business, FY2015-FY2020
- Hitachi Automotive Systems' Major Customers for Its EV Inverters
- Mitsubishi Electric's Financial Indices, FY2013-2018
- Revenue Structure of Mitsubishi Electric by Business, FY2009-FY2018
- EV Used J1 Series Power Module EVPM of Mitsubishi Electric
- J1 Series Power Module EVPM Product Matrix and Packaging Structure
- Mitsubishi Electric's Major Customers for Its EV Inverters
- Meidensha's Financial Indices, FY2014-FY2018
- Meidensha's Revenue and Profits (by Division), FY2016-FY2018
- Meidensha's Major Customers for Its EV Inverters
- Toshiba's Revenue and Net Income, FY2014-2018
- Toshiba's Revenue Structure (by Business), FY2018
- Toshiba's Major Customers for Its EV Inverters
- Toshiba TLX9309 Photocoupler
- Global Presence of Hyundai Mobis' Customers




## Selected Charts

- 
- Revenue Planning of Hyundai Mobis by Business, 2018-2025E
  - Hyundai Mobis' Revenue and Operating Margin, FY2006- FY2017
  - Hyundai Mobis' Major Customers for Its EV Inverters
  - Delphi's Financials, 2014-2017
  - Delphi's Major Customers and Regional Distribution
  - Delphi's Major Customers and Revenue Contribution, 2017
  - Delphi's Product Distribution in EV Field
  - Technical Features of Delphi's EV Inverters
  - Delphi Viper Double-sided Heat Dissipation Structure
  - Delphi's Major Customers for Its EV Inverters
  - Bosch's Revenue and EBIT, 2011-2017
  - Bosch's Revenue Structure (by Division), 2012-2017
  - Revenue and EBIT of Bosch's Automotive Division, 2012-2017
  - Bosch's Revenue Structure (by Region), 2012-2017
  - Bosch's Revenue in Major Countries, 2016-2017
  - Bosch's Major Customers for Its EV Inverters
  - Continental's Revenue and EBIT, 2011-2017
  - Continental's Revenue Structure (by Division), 2008-2013
  - Continental's Revenue Structure (by Region), 2008-2013
  - Continental's Major Customers for Its EV Inverters
  - Fuji Electric's Main Financial Indices, FY2012-FY2018
  - Fuji Electric's Revenue and Operating Income (by Business), FY2013-FY2018
  - Fuji Electric's Revenue Breakdown (by Region), FY2013-FY2018
  - Revenue of Fuji Electric's Power Devices Division, FY2016-FY2020
  - IGBT and SiC R&D Planning of Fuji Electric, 2015-2021



- 
- Fuji Electric's Plan for Expanding Production of Power Devices
  - 7th-generation IGBT Product Planning of Fuji Electric, 2016-2018
  - Fuji Electric's Plan for Mass-production of New IGBT Products
  - Industrial IGBT / SiC Loss Comparison, 2015-2017
  - Automotive Power Module Development Roadmap of Fuji Electric, 2005-2025
  - Global Rankings of Infineon's Three Major Businesses, 2017
  - Global Rankings of Infineon's Automotive Electronics, 2017
  - Infineon's Revenue Breakdown (by Region), FY2017-FY2018
  - Infineon's Revenue Breakdown (by Division), FY2017-FY2018
  - Infineon HybridPACK? Family IGBT Modules
  - Denso's Revenue and Profits, FY2017-FY2018
  - Denso's Revenue and Operating Income (by Region), FY2017-FY2018
  - Denso's Revenue Breakdown (by Customer), FY2017-FY2018
  - Denso's Client Structure, FY2017-FY2018
  - Power Electronics Projects of Japanese NEDO
  - ROHM's Financial Indices, FY2013-FY2018
  - ROHM's Revenue Breakdown (by Business), FY2012-FY2019
  - ROHM's Revenue Breakdown (by Region), FY2012-FY2019
  - ROHM's Revenue Breakdown (by Application), FY2018
  - Main Technical Parameters of ROHM's Vehicle-used IGBT Module
  - ROHM IGBT-IPM Structure
  - Comparison of Loss between General IGBT-IPM and ROHM MOS-IPM
  - Development History of ROHM's SiC Products
  - SiC-based Power Device Lineup of ROHM
  - IR's Revenue Breakdown (by Division), FY2012-FY2014

## Selected Charts

- 
- Operation of Semikron
  - Key IGBT Brands of Semikron
  - Product Portfolio of SEMIKRON's SKiM modules
  - Key Features of SEMIKRON's SKiM modules
  - Product Portfolio of SEMIKRON's SKiiP IPM
  - Key Features of SEMIKRON's SKiiP IPM
  - Structure of SEMIDRON's SKAI Power Electronic Platform
  - Product Portfolio of SEMIKRON's SKAI Power Electronic Platform
  - Key Features of SEMIKRON's SKAI Power Electronic Platform

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