Action Plan for the Development of Basic Electronic Components Industry (2021-2023)

The information technology industry is a strategic, basic and pioneering industry related to the security and development of the national economy, and it is also a competitive highland to which the major countries in the world attach great importance and make every effort to lay out. Electronic components are the cornerstone to support the development of information technology industry, and also the key to ensure the security and stability of the industrial chain supply chain. At present, China's electronic components industry exists as a whole, but not strong, the lack of leading enterprises, insufficient innovation capacity and other issues, restricting the development of information technology industry. In the face of a century of unprecedented changes and industrial upgrading, industry integration situation, speed up the electronic components and supporting materials and equipment and instruments and other basic electronic industry development, to promote the information technology industry, advanced industrial base, industry chain modernization, and even to achieve high-quality development

of the national economy is of great significance. In order to thoroughly implement the decision-making and deployment of the CPC Central Committee and the State Council, continuously improve the guarantee capacity and industrialization level, and support the key short-board products and technology research and development in the field of electronic components, this Action Plan is hereby formulated.

I. General requirements

(i) Guiding philosophy

Guided by Xi Jinping's thought of socialism with Chinese characteristics in the new era, comprehensively implement the spirit of the 19th CPC National Congress and the 2nd, 3rd, 4th and 5th Plenary Sessions of the 19th CPC Central Committee, with the theme of promoting high-quality development, deepening the supply-side structural reform as the main line, and reform and innovation as the fundamental driving force, to strengthen the electronic components industry, consolidate the IT

The goal is to support key industries with key core technologies as the main direction of attack.

The industry market application, the establishment of a sound industrial chain supporting system, to promote the basic electronic components industry to achieve high-quality development, to protect the national information technology industry security.

(ii) Overall objectives

By 2023, the competitiveness of advantageous products will be further strengthened, the level of secure supply of the industrial chain will be significantly improved, and the breakthroughs in basic electronic components will be promoted for important industries such as smart terminals, 5G, and industrial Internet, the supply chain protection capacity of key materials, equipment and instruments will be strengthened, and the level of modernization of the industrial chain supply chain will be enhanced.

--The scale of the industry continues to grow. Total sales of electronic components reached 2,100 billion yuan, further consolidating China's position as a major global producer of electronic components and fully meeting the needs of the information technology market.

--Technological innovation breakthroughs. Breakthroughs in a number of key technologies of electronic components, the industry's overall investment in innovation to

further enhance the RF filter, high-speed connectors, chip multilayer ceramic capacitors, optical communication devices and other key products, patent layout is more complete.

-Effective enterprise development. Formation of a number of internationally competitive electric Subcomponent enterprises, and strive to 15 enterprises revenue scale exceeded 10 billion yuan, leading enterprises revenue scale and comprehensive strength to effectively enhance the anti-risk and reinvestment capacity has been significantly strengthened.

II. Priorities

(i) Enhancement of industrial innovation capacity

Tackling key core technologies. Implementation of high-end enhancement of key products action, oriented to the electric

road components and other key products, break through the patent and technical barriers that restrict the development of the industry.

Make up for the shortcomings in the development of electronic components and ensure the security and stability of the industrial chain supply chain.

Column 1 High-end Enhancement Actions for Key Products

Circuit components. Focus on the development of miniaturized, chip-type resistance and capacitance sensing components, high-frequency, high-precision frequency components, high-temperature, high-voltage, low-loss, high-reliability semiconductor discrete devices and modules, miniaturized, high-reliability, high-sensitivity electronic protection devices, high-performance, multi-functional, high-density hybrid integrated circuits.

Connection components. Focus on the development of high-frequency and high-speed, low-loss, miniaturized optoelectronic connectors, ultra-high-speed, ultra-low loss, low-cost fiber optic cables, high-voltage, high-temperature, high tensile strength of electrical equipment and cables, high-frequency and high-frequency, high-level high-density printed circuit boards, integrated circuits, packaging substrates, special printed circuit boards.

Electromechanical components. Focus on the development of high-voltage, high-current, miniaturized, low-

power control relays, miniaturized, high-reliability switch buttons, miniaturized, integrated, high-precision, energy-efficient micro motors.

Sensing components. Focus on the development of miniaturized, low-power, integrated, high-sensitivity sensitive components, temperature, gas, displacement, speed, photoelectricity, biochemistry and other categories of high-end sensors, new types of MEMS sensors and intelligent sensors, miniaturized, intelligent electro-acoustic devices.

Functional material components. Focus on the development of high magnetic energy, high coercivity permanent magnetic components, high permeability, low magnetic loss soft magnetic components, high thermal conductivity, electrical insulation, low loss, lead-free and environmentally friendly electronic ceramic components.

Optical communication devices. Focus on the development of high-speed optical communication chips, high-speed high-precision optical

Detectors, high-speed direct and externally modulated lasers, high-speed modulator chips, high-power lasers, digital signal processor chips for optical transmission, high-speed drivers and transimpedance amplifier chips.

Build a multi-level joint innovation system. Support enterprises, colleges and universities and research institutes to strengthen cooperation, explore the establishment of manufacturing innovation centers in the field of electronic components, increase the research and development of key common technologies, leading-edge technologies, modern engineering technologies and disruptive technologies, and set up a platform for collaborative innovation and transformation of achievements in which industry, academia, research and use are closely integrated. Encourage localities to focus on the characteristics or subdivided areas, to carry out research and development of key technologies and industrialization, to form a differentiated development.

Improve the layout of intellectual property rights.

Encourage enterprises, institutions of higher learning and research institutes to improve their

Awareness of intellectual property protection, improve intellectual property management system and carry out intellectual property layout at home and abroad. Explore the

establishment of patent pools and carry out patent analysis and early warning around electronic components. Cultivate intellectual property pilot enterprises.

(ii) Strengthening the promotion of market applications

Support market application in key industries. Implement key market application promotion actions, promote the differentiated application of electronic components in key industries such as intelligent terminals, 5G, industrial Internet and data centers, intelligent networked cars, etc., and accelerate the attraction of social resources for products and iterative upgrading.

Column 2 Key Market Application Promotion Actions

Smart Terminal Market. Targeting smartphones, wearables, drones, VR/AR devices, environmental monitoring devices and other smart terminal markets, promoting microchip Capacitive components, miniature high-current inductors, miniature RF filters, miniature sensors

The application of electronic components such as chip-type, miniaturized, lightweight, flexible and high-performance electronic components, such as devices, micro motors and high-end lithium batteries.

5G, Industrial Internet and Data Center Market. Seizing the opportunity of global 5G and industrial Internet, focusing on the construction of 5G network, industrial Internet and data center, we will focus on promoting the application of electronic components affecting the high-speed transmission of communication equipment, such as RF resistive components, medium- and high-frequency components, special printed circuit boards, high-speed transmission cables and connecting assemblies, and optical communication devices.

New Energy Vehicle and Intelligent Internet Connected Vehicle Market. Grasping the market opportunity of the transformation of traditional automobiles into electrified, intelligent, and Internet-connected new energy vehicles and intelligent Internet-connected vehicles, we focus on promoting the application of electronic components such as automotive-grade sensors, capacitors (including supercapacitors), resistors, frequency components, connectors and cable assemblies, microtronic motors, control relays, and new types of chemical and physical batteries.

Industrial automation equipment market. Taking advantage of the opportunities for automation and intelligent upgrading in China's industrial sector, we focus on promoting the application of industrial-grade electronic components such as servo motors, control relays, sensors, fiber optic cables, optical communication devices and so on for such fields as industrial robots and intelligent control systems.

High-end equipment manufacturing market. Facing China's booming high-end equipment manufacturing fields such as high-speed trains, civil aerospace, marine engineering equipment, high-tech ships, energy equipment, etc., the company promotes the application of high-reliability electronic components such as submarine optical cables, underwater connectors, power devices, and high-voltage DC relays.

Strengthening deep-level cooperation in the industrial chain. Promote electronic components and their supporting materials and equipment and instrument enterprises, machine enterprises to strengthen the linkage, jointly carry out product development, accelerate the

Industrialization and application of new electronic components.
Guiding upstream and downstream enterprises through strategic alliances

Alliances, capital cooperation, technology linkage and other methods to form stable cooperative relationships.

Accelerating the application and promotion of innovative products. Facing the emerging needs of artificial intelligence, advanced computing, Internet of Things, new energy, new infrastructure and other emerging needs, develop miniaturized, high-performance, high-efficiency and high-reliability electronic components that are urgently needed in key application areas, and promote the active application of innovative products by whole enterprises to accelerate the iterative upgrading of component products.

(iii) Strengthening the foundation of supporting industries

Breakthroughs in key materials technology. Support the R&D and production of electronic ceramic materials, magnetic materials, battery materials and other electronic functional materials upstream of electronic components, electronic pastes and other process and auxiliary materials, high-end printed circuit board materials and other packaging and mounting materials. Enhance the supporting capacity and promote the R&D and industrialization of electronic special materials in key areas.

Enhancement of equipment and instruments supporting capacity. Support the technical difficulty, high application value, strong versatility, the electronic components industry to drive a large supporting electronic special equipment and instruments, such as etching and developing equipment and other process equipment, micro-CT and other testing and analytical instruments, research and development and industrialization, to enhance the quality and reliability of equipment and instruments.

Improve the industrial supporting system. Encourage and guide the chemical industry, non-ferrous metals, light machinery, equipment and instruments and other enterprises to enter the field of electronic components, to carry out research and development and production of key materials and equipment, to promote collaborative innovation between industry, academia and research, to achieve synergistic development of the whole industry chain, to enhance the test and verification capabilities, and to improve the level of key links supporting.

(iv) Guiding industrial transformation and upgrading

Enhance the level of intelligence. Guide enterprises to build digital design platforms, full-environment simulation platforms and databases for materials, processes and failure analysis, based on machine learning and human

Industrial intelligence technology, promote the digitalization and network transformation of key processes, and optimize the production process.

The company will carry out the construction of smart factories and improve the level of smart manufacturing.

Column 3 Intelligent Manufacturing Promotion Actions

Promote intelligent design. Domestic software enterprises are being guided to develop various types of simulation and design software for electronic components, and the use of advanced technologies such as virtual reality and digital twins is being encouraged to carry out industrial design and improve the design level of enterprises.

Accelerate intelligent transformation. Focusing on connectors and cable assemblies, electronic transformers, electro-acoustic devices, micro motors and other sub-industries that use a large amount of labor and are based on small-lot, multi-lot orders, explore and promote modularization, digital production methods, and accelerate intelligent upgrading.

Cultivate industrial Internet platforms. Encourage and support branch industries with a better industrial foundation to explore industrial Internet construction modes, encourage leading enterprises to open and share business systems for the industry, and drive enterprises upstream and downstream of the industrial chain to carry

out collaborative design and collaborative supply chain management.

Promoting green manufacturing. Promote industry-wide energy-saving and water-saving technological transformation, accelerate the application of clean and efficient production processes, carry out clean production, reduce energy consumption and pollutant emission intensity, and realize green production. Optimize the product structure design of electronic components, and develop high value-added, low-consumption and low-emission products. Formulate relevant standards for green manufacturing in the electronic components industry and improve the green manufacturing system.

Column 4 Green Manufacturing Enhancement Actions

Construction of green factories. In accordance with the intensive plant, harmless raw materials, clean production The principles of purification, waste resourcing, and low-carbon energy guide electronic component companies to build

Setting up green factories, increasing energy-saving and environmental protection investment, implementing energy-saving and environmental protection technology upgrading projects, encouraging enterprises to adopt information technology and intelligent technology to deal with pollutants and monitor them in real time, and linking the environmental protection implementation measures of the enterprises with their credit ratings.

Production of green products. Strictly implement policies such as the Measures for the Administration of Restrictions on the Use of Hazardous Substances in Electrical and Electronic Products, encourage backbone enterprises to carry out green design for the entire life cycle of their products, and accelerate the application of new electronic components that are lightweight, modular, integrated, highly reliable, long-lived and easy to recycle.

Developing green parks. Strengthen cooperation between enterprises in electronic components-related industrial parks and other enterprises, and promote infrastructure sharing. Develop a circular economy and strengthen the recycling of waste heat and pressure, waste heat resources and water resources.

Building a green supply chain. Supporting backbone enterprises to implement sustainable green supply chain management strategies, implementing green

partnership-based supplier management, strengthening environmental protection assessment of upstream suppliers, prioritizing the development of green factories into suppliers, and prioritizing the procurement of green products.

Cultivating high-quality enterprises. Encourage leading enterprises to integrate resources, expand production scale, enhance core competitiveness, improve compliance and risk-resistance through mergers and reorganization, capital operation and other means. Cultivate a number of specialized, special and new "small giants" with independent intellectual property rights, high value-added products and core competitiveness, as well as single-champion enterprises in the manufacturing industry.

(✉) Promoting quality improvement in the industry

Strengthening standardization. Strengthen the development of standards for key core technologies and basic common technologies, and continuously improve the quality and level of the supply of standards. Guide social organizations to speed up the formulation and release of innovative and international group standards. Encourage enterprises and institutions and

Experts are actively involved in international standardization activities and international standard-setting.

Enhance the quality and brand benefits. Optimize product design, renovate technical equipment, improve inspection and testing, and promote advanced quality culture and technology. Guide enterprises to establish a quality-based brand development strategy, enrich brand connotation, and enhance brand image and influence. It carries out activities such as quality development and brand cultivation, and regularly releases quality and brand reports.

Optimize the market environment. Guiding terminal enterprises to optimize the procurement mode of electronic component products, advocating high quality and low price, avoiding irrational market behaviors such as low-priced vicious competition, price-boosting, and reckless speculation, and promoting the construction of a fair, just, open and orderly market competition environment.

(vi) Strengthening public platforms

Construction of public platform for analysis and evaluation. Support capable, qualified enterprises and institutions to build a national-level public service platform for analysis and evaluation of electronic components, strengthen the construction of quality and technical grade classification standards, and carry out product testing and analysis, rating, reliability, application verification and other services around

various fields of electronic components, so as to provide a basis for the design of electronic system integrators and the selection of materials.

Building science and technology service platforms. Support localities, parks, enterprises and institutions to build a number of public service platforms to carry out intellectual property rights training and trading, evaluation of scientific and technological achievements, market strategy research and other services. Encourage the construction of production lines for specialized electronic components, and provide flow services for MEMS sensors, filters, optical communication module driver chips, and so on. **Construct innovation and entrepreneurship incubation platform.** Support crowd creation and crowdsourcing in the field of electronic components, Crowd support, crowdfunding and other entrepreneurial support platform construction, promote the establishment of a number of basic electronic components industry ecological incubators, gas pedals, and encourage the provision of capital and technology for start-ups,

Market application and promotion and other support.

(vii) Improving the mechanism for attracting and nurturing talents

(c) Increase efforts to cultivate talents. Deepen the integration of industry and education, and promote higher education institutions to optimize the phase of

(c) Offer academic discipline construction and professional layout. Enterprises are encouraged to establish innovation platforms such as enterprise research institutes, academicians and post-doctoral workstations, to set up comprehensive training and practice bases for talents combined with schools and enterprises, and to support enterprises in carrying out on-the-job education and training for their employees at home and abroad.

Strengthen the introduction of talent cultivation. Introduce high-end talents and young talents through multiple channels, and accelerate the formation of a team of experts with international leading level. Give full play to the role of industry organizations and universities and colleges, encourage enterprises to cultivate and introduce scientific and technological leaders and teams that master key technologies, and provide intellectual support for industrial development.

Guiding the reasonable mobility of talents. Guide enterprises to recruit talents through compliant channels,

guarantee the normal flow of talents among enterprises, strengthen the publicity of professional ethics, reduce the loss of personnel mobility, and encourage enterprises to create favorable growth space for talents, enhance the welfare benefits, improve the career advancement channel of talents, and enhance the sense of belonging of talents in the electronic components industry.

III. Safeguards

(a) Strengthen industrial coordination. Establish and improve the coordination mechanism for the development of the electronic components industry, strengthen coordination and coordination, and actively promote the resolution of major issues and key work in industrial development. Strengthen cooperation between the central government and the local government, and guide the local government to plan the layout of key projects of basic electronic components, and promote the centralization of the main body and regional agglomeration at the right time. It will do a good job of monitoring, analyzing and tracking research in key areas, strengthen the convergence with existing relevant policies, and promote various actions in an orderly manner.

(ii) Increase policy support. Around the electronic components industry, to promote the birth

Production, application, financing and other cooperation and convergence, to accelerate the marketization and promotion of application. Make full use of Industrial base reconstruction and other channels to support innovation breakthroughs. Encourage the manufacturing transformation and upgrading fund and other investment efforts to guide the local investment funds to support the synergy. Give full play to the role of market mechanism, encourage the participation of social capital, attract venture capital, financial leasing and other diversified funds to support industrial development.

(c) Optimize the environment for industrial development. Strengthen the electronic components industry monopoly, dumping, price protection, infringement of intellectual property rights and other acts of unfair competition early warning and prevention, to maintain fair competition, healthy and orderly market development environment. Promote the industry integrity management, tax payment in accordance with the law, energy saving and environmental protection, and harmonious employment. Guide the electronic components industry credit system construction, the implementation of enterprise product standards, quality, safety self-declaration and supervision system.

(d) Deepening international exchanges and

cooperation. Implement the "One Belt, One Road" initiative, expand International exchange and cooperation channels for the electronic components industry, strengthen exchanges and communications with relevant international organizations, standardization bodies, etc., and promote docking with international advanced technology and industry chain. Promote the domestic and international mutual promotion of the electronic components industry, encourage the world's leading enterprises to set up production bases and R & D institutions in China, support backbone enterprises to develop overseas markets, and foreign institutions to carry out various forms of technology, talent, capital and other forms of cooperation, and to build an industry pattern of open development and win-win cooperation.

基础电子元器件产业发展行动计划
（2021—2023 年）

信息技术产业是关系国民经济安全和发展的战略性、基础性、先导性产业，也是世界主要国家高度重视、全力布局的竞争高地。电子元器件是支撑信息技术产业发展的基石，也是保障产业链供应链安全稳定的关键。当前我国电子元器件产业存在整体大而不强、龙头企业匮乏、创新能力不足等问题，制约信息技术产业发展。面对百年未有之大变局和产业大升级、行业大融合的态势，加快电子元器件及配套材料和设备仪器等基础电子产业发展，对推进信息技术产业基础高级化、产业链现代化，乃至实现国民经济高质量发展具有重要意义。为深入贯彻落实党中央、国务院决策部署，持续提升保障能力和产业化水平，支持电子元器件领域关键短板产品及技术攻关，特制定本行动计划。

一、总体要求

（一）指导思想

以习近平新时代中国特色社会主义思想为指导，全面贯彻落实党的十九大和十九届二中、三中、四中、五中全会精神，以推动高质量发展为主题，以深化供给侧结构性改革为主线，以改革创新为根本动力，以做强电子元器件产业、夯实信息技

术产业基础为目标，以关键核心技术为主攻方向，支持重点行业市场应用，建立健全产业链配套体系，推动基础电子元器件产业实现高质量发展，保障国家信息技术产业安全。

（二）总体目标

到2023年，优势产品竞争力进一步增强，产业链安全供应水平显著提升，面向智能终端、5G、工业互联网等重要行业，推动基础电子元器件实现突破，增强关键材料、设备仪器等供应链保障能力，提升产业链供应链现代化水平。

——**产业规模不断壮大。**电子元器件销售总额达到21000亿元，进一步巩固我国作为全球电子元器件生产大国的地位，充分满足信息技术市场规模需求。

——**技术创新取得突破。**突破一批电子元器件关键技术，行业总体创新投入进一步提升，射频滤波器、高速连接器、片式多层陶瓷电容器、光通信器件等重点产品专利布局更加完善。

——**企业发展成效明显。**形成一批具有国际竞争优势的电子元器件企业，力争15家企业营收规模突破100亿元，龙头企业营收规模和综合实力有效提升，抗风险和再投入能力明显增强。

二、重点工作

（一）提升产业创新能力

攻克关键核心技术。实施重点产品高端提升行动，面向电

路类元器件等重点产品，突破制约行业发展的专利、技术壁垒，补足电子元器件发展短板，保障产业链供应链安全稳定。

专栏 1　重点产品高端提升行动

电路类元器件。重点发展微型化、片式化阻容感元件，高频率、高精度频率元器件，耐高温、耐高压、低损耗、高可靠半导体分立器件及模块，小型化、高可靠、高灵敏度电子防护器件，高性能、多功能、高密度混合集成电路。

连接类元器件。重点发展高频高速、低损耗、小型化的光电连接器，超高速、超低损耗、低成本的光纤光缆，耐高压、耐高温、高抗拉强度电气装备线缆，高频高速、高层高密度印制电路板、集成电路封装基板、特种印制电路板。

机电类元器件。重点发展高压、大电流、小型化、低功耗控制继电器，小型化、高可靠开关按钮，小型化、集成化、高精密、高效节能微特电机。

传感类元器件。重点发展小型化、低功耗、集成化、高灵敏度的敏感元件，温度、气体、位移、速度、光电、生化等类别的高端传感器，新型 MEMS 传感器和智能传感器，微型化、智能化的电声器件。

功能材料类元件。重点发展高磁能积、高矫顽力永磁元件，高磁导率、低磁损耗软磁元件，高导热、电绝缘、低损耗、无铅环保的电子陶瓷元件。

光通信器件。重点发展高速光通信芯片、高速高精度光

探测器、高速直调和外调制激光器、高速调制器芯片、高功率激光器、光传输用数字信号处理器芯片、高速驱动器和跨阻抗放大器芯片。

构建多层次联合创新体系。支持企业、高等院校及科研院所加强合作，在电子元器件领域探索成立制造业创新中心，加大关键共性技术、前沿引领技术、现代工程技术、颠覆性技术研发力度，搭建产学研用紧密结合的协同创新和成果转化平台。鼓励各地围绕特色或细分领域，开展关键技术研发与产业化，形成差异化发展。

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（二）强化市场应用推广

支持重点行业市场应用。实施重点市场应用推广行动，在智能终端、5G、工业互联网和数据中心、智能网联汽车等重点行业推动电子元器件差异化应用，加速产品吸引社会资源，迭代升级。

专栏 2　重点市场应用推广行动

智能终端市场。瞄准智能手机、穿戴式设备、无人机、VR/AR 设备、环境监测设备等智能终端市场，推动微型片式阻容元件、微型大电流电感器、微型射频滤波器、微型传感

器、微特电机、高端锂电等片式化、微型化、轻型化、柔性化、高性能的电子元器件应用。

5G、工业互联网和数据中心市场。抢抓全球5G和工业互联网契机，围绕5G网络、工业互联网和数据中心建设，重点推进射频阻容元件、中高频元器件、特种印制电路板、高速传输线缆及连接组件、光通信器件等影响通信设备高速传输的电子元器件应用。

新能源汽车和智能网联汽车市场。把握传统汽车向电动化、智能化、网联化的新能源汽车和智能网联汽车转型的市场机遇，重点推动车规级传感器、电容器（含超级电容器）、电阻器、频率元器件、连接器与线缆组件、微特电机、控制继电器、新型化学和物理电池等电子元器件应用。

工业自动化设备市场。利用我国工业领域自动化、智能化升级的机遇，面向工业机器人和智能控制系统等领域，重点推进伺服电机、控制继电器、传感器、光纤光缆、光通信器件等工业级电子元器件的应用。

高端装备制造市场。面向我国蓬勃发展的高铁列车、民用航空航天、海洋工程装备、高技术船舶、能源装备等高端装备制造领域，推动海底光电缆、水下连接器、功率器件、高压直流继电器等高可靠电子元器件的应用。

强化产业链深层次合作。推动电子元器件及其配套材料和设备仪器企业、整机企业加强联动，共同开展产品研制，加快

新型电子元器件的产业化应用。引导上下游企业通过战略联盟、资本合作、技术联动等方式，形成稳定合作关系。

加速创新型产品应用推广。面向人工智能、先进计算、物联网、新能源、新基建等新兴需求，开发重点应用领域急需的小型化、高性能、高效率、高可靠电子元器件，推动整机企业积极应用创新型产品，加速元器件产品迭代升级。

（三）夯实配套产业基础

突破关键材料技术。支持电子元器件上游电子陶瓷材料、磁性材料、电池材料等电子功能材料，电子浆料等工艺与辅助材料，高端印制电路板材料等封装与装联材料的研发和生产。提升配套能力，推动关键环节电子专用材料研发与产业化。

提升设备仪器配套能力。支持技术难度大、应用价值高、通用性强、对电子元器件行业带动大的配套电子专用设备与仪器，如刻蚀显影设备等工艺设备、显微 CT 等检测分析仪器的研发及产业化，提升设备仪器质量和可靠性水平。

健全产业配套体系。鼓励和引导化工、有色金属、轻工机械、设备仪器等企业进入电子元器件领域，开展关键材料、设备的研发和生产，推进产学研用协同创新，实现全产业链协同发展，增强试验验证能力，提升关键环节配套水平。

（四）引导产业转型升级

提升智能化水平。引导企业搭建数字化设计平台、全环境仿真平台和材料、工艺、失效分析数据库，基于机器学习与人

工智能技术，推进关键工序数字化、网络化改造，优化生产工艺及质量管控系统，开展智能工厂建设，提升智能制造水平。

专栏 3　智能制造推进行动

推广智能化设计。引导国内软件企业开发各类电子元器件仿真设计软件，鼓励使用虚拟现实、数字孪生等先进技术开展工业设计，提高企业设计水平。

加快智能化改造。围绕连接器与线缆组件、电子变压器、电声器件、微特电机等用工量大且以小批量、多批次订单为主的分支行业，探索和推广模块化、数字化生产方式，加快智能化升级。

培育工业互联网平台。鼓励和支持产业基础较好的分支行业，探索工业互联网建设模式，鼓励龙头企业面向行业开放共享业务系统，带动产业链上下游企业开展协同设计和协同供应链管理。

推广绿色制造。推进全行业节能节水技术改造，加快应用清洁高效生产工艺，开展清洁生产，降低能耗和污染物排放强度，实现绿色生产。优化电子元器件产品结构设计，开发高附加值、低消耗、低排放产品。制定电子元器件行业绿色制造相关标准，完善绿色制造体系。

专栏 4　绿色制造提升行动

建设绿色工厂。按照厂房集约化、原料无害化、生产洁净化、废物资源化、能源低碳化原则引导电子元器件企业建

设绿色工厂，加大节能环保投入，实施节能环保技术提升工程，鼓励企业采用信息化、智能化技术处理污染物并实时监控，将企业的环保执行措施与企业信用等级挂钩。

生产绿色产品。严格执行《电器电子产品有害物质限制使用管理办法》等政策，鼓励骨干企业开展产品全生命周期的绿色化设计，加快轻量化、模块化、集成化、高可靠、长寿命、易回收的新型电子元器件产品应用。

发展绿色园区。加强电子元器件相关产业园区企业与其他企业的合作，推动基础设施共建共享。发展循环经济，加强余热余压废热资源和水资源循环利用。

搭建绿色供应链。支持骨干企业实施可持续的绿色供应链管理战略，实施绿色伙伴式供应商管理，加强对上游供应商的环保考核，优先将绿色工厂发展成供应商，优先采购绿色产品。

培育优质企业。鼓励龙头企业通过兼并重组、资本运作等方式整合资源、扩大生产规模、增强核心竞争力、提高合规履责和抗风险能力。培育一批具有自主知识产权、产品附加值高、有核心竞争力的专精特新“小巨人”和制造业单项冠军企业。

（五）促进行业质量提升

加强标准化工作。加强关键核心技术和基础共性技术的标准研制，持续提升标准的供给质量和水平。引导社会团体加快制定发布具有创新性和国际性的团体标准。鼓励企事业单位和

专家积极参与国际标准化活动，开展国际标准制定。

提升质量品牌效益。优化产品设计、改造技术设备、完善检验检测，推广先进质量文化与技术。引导企业建立以质量为基础的品牌发展战略，丰富品牌内涵，提升品牌形象和影响力。开展质量兴业、品牌培育等活动，定期发布质量品牌报告。

优化市场环境。引导终端企业优化电子元器件产品采购模式，倡导优质廉价，避免低价恶性竞争、哄抬价格、肆意炒作等非理性市场行为，推动构建公平、公正、开放、有序的市场竞争环境。

（六）加强公共平台建设

建设分析评价公共平台。支持有能力、有资质的企事业单位建设国家级电子元器件分析评价公共服务平台，加强质量品质和技术等级分类标准建设，围绕电子元器件各领域开展产品检测分析、评级、可靠性、应用验证等服务，为电子系统整机设计、物料选型提供依据。

建设科技服务平台。支持地方、园区、企事业单位建设一批公共服务平台，开展知识产权培训与交易、科技成果评价、市场战略研究等服务。鼓励建设专用电子元器件生产线，为MEMS传感器、滤波器、光通信模块驱动芯片等提供流片服务。

建设创新创业孵化平台。支持电子元器件领域众创、众包、众扶、众筹等创业支撑平台建设，推动建立一批基础电子元器件产业生态孵化器、加速器，鼓励为初创企业提供资金、技术、

市场应用及推广等扶持。

（七）完善人才引育机制

加大人才培养力度。深化产教融合，推动高等院校优化相关学科建设和专业布局。鼓励企业建立企业研究院、院士和博士后工作站等创新平台，建立校企结合的人才综合培训和实践基地，支持企业开展员工国内外在职教育培训。

加强人才引进培育。多渠道引进高端人才和青年人才，加快形成具有国际领先水平的专家队伍。发挥行业组织及大专、高等院校作用，鼓励企业培育和引进掌握关键技术的科技领军人才和团队，为产业发展提供智力支持。

引导人才合理流动。引导企业通过合规途径招聘人才，保障人才在企业间的正常流动，加强职业道德宣传，降低人员流动损失，鼓励企业为人才创造有利的成长空间，提升福利待遇，完善人才职业晋升通道，提升电子元器件行业人才归属感。

三、保障措施

（一）加强产业统筹协调。建立健全电子元器件产业发展协调机制，加强协同配合和统筹推进，积极推动解决产业发展中重大事项和重点工作。加强央地合作，指导各地统筹规划基础电子元器件重点项目布局，适时推进主体集中和区域集聚。做好重点领域监测分析和跟踪研究，加强与现行相关政策衔接，有序推进各项行动。

（二）加大政策支持力度。围绕电子元器件产业，推动生

产、应用、融资等合作衔接，加快市场化推广应用。充分利用产业基础再造等渠道支持创新突破。鼓励制造业转型升级基金等加大投资力度，引导地方投资基金协同支持。发挥市场机制作用，鼓励社会资本参与，吸引风险投资、融资租赁等多元化资金支持产业发展。

（三）优化产业发展环境。加强对电子元器件行业垄断、倾销、价格保护、侵犯知识产权等不正当竞争行为的预警和防范，维护公平竞争、健康有序的市场发展环境。促进行业诚信经营、依法纳税、节能环保、和谐用工。引导电子元器件行业信用体系建设，推行企业产品标准、质量、安全自我声明和监督制度。

（四）深化国际交流合作。落实“一带一路”倡议，拓展电子元器件产业国际交流合作渠道，加强与相关国际组织、标准化机构等交流沟通，推动与国际先进技术及产业链对接。推动电子元器件产业国内国际相互促进，鼓励全球领先企业来华设立生产基地和研发机构，支持骨干企业开拓海外市场，与境外机构开展多种形式的技术、人才、资本等合作，构建开放发展、合作共赢的产业格局。