Circular on Printing and Distributing the
12th Five-Year Plan for the Development of the Integrated Circuits Industry

With a view to implementing the Industrial Transformation and Improvement Plan (2011-2015), the 12th Five Year Plan for the Development of the Information Industry and the 12th Five Year Plan for the Development of Electronics and IT Products, and promoting the sustained, rapid and healthy development of the IC industry, the Ministry of Industry and Information Technology has developed the 12th Five Year Plan for the Development of the Integrated Circuits Industry, which is now distributed to you. Please enforce them faithfully according to your local industrial conditions.

Ministry of Industry and Information Technology of P.R.C.
(seal)
December 5, 2011
12th Five-Year Plan
for the Development of the Integrated Circuits Industry
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Foreword

The integrated circuits (IC) industry is the strategic, basic and leading industry for promoting the development of national economy and society, is the core of and foundation for cultivating and developing strategic emerging industries, and fully integrating informatization with industrialization, and also an important industry supporting the efforts to change the economic development pattern, adjust industrial structure and assure national information security. Its strategic position is becoming increasingly important. Boasting strong IC technologies and industry is an important symbol of moving toward an innovative country.

The coming five to ten years is an important period of strategic opportunity for the development of China’s IC industry, and also a period for tackling key problems to achieve industry development. It is of important practical and historical significance to identify the industry development trends scientifically and follow them closely, concentrate on changing the development pattern and adjusting industrial structure, and driven by technological innovation, institutional innovation and innovation of business models, make great efforts to boost the industry’s core competitiveness, push the industry to grow big and strong, and promote the sustained, rapid and healthy development of the IC industry.

Implement the Outline of the National 12th Five Year Plan for the Development of the National Economy and Society, and in light of overall requirements of the Industrial Transformation and Improvement Plan (2011-2015), the 12th Five Year Plan for the Development of the Strategic Emerging Industries, the 12th Five Year Plan for the Development of Information Industry and the 12th Five Year Plan for the Development of Electronics and IT Products, on the basis of extensive surveys and thorough studies, bring up strategic ideas on development, and develop a development plan specific to IC industry to serve as the guideline document for the development of IC sector and as the basis for tightening the administration of the sector.
I. Review of the 11th Five-Year Period

During the 11th Five Year Period, China’s IC industry has maintained a momentum of rapid growth beginning in 2000, and managed to overcome both the global financial crisis and the silicon cycle in the IC industry, leading to remarkably improved overall strength of the industry, which has thus played an increasingly noticeable role in stimulating the development of China’s electronic information industry and its economy and society.

(i) Size of the industry continued to expand
The size of the industry has doubled. The industry’s output and sales have increased from 26.58 billion units and RMB 70.2 billion respectively in 2005 to 65.25 billion units and RMB 144 billion in 2010, expanding its share in the global IC market from 4.5% in 2005 to 8.6% in 2010. The domestic market has increased from RMB 380 billion in 2005 to RMB 735 billion in 2010, a 43.8% market share in the global IC market.

(ii) Innovation capability improved remarkably
Thanks to the support of such national key science & technology projects as Core Electronic Devices, High-end General Chips and Basic Software Products (He Gao Ji national development project), and Very Large Scale Integrated Circuit Manufacturing Equipment and Complete Set of Technology, most design firms have acquired abilities to design less than 0.25μm chips and million-gate design capability, some even mastered advanced 40nm design capability. Major breakthroughs were made in high-end general-use chips for central processing units (CPU), digital signal processors (DSP), micro-control units (MCU) and memory, a number of system-on-chip (SoC) products such as TD-SCDMA chips, digital TV chips and information security chips could be mass produced, chip manufacturing capability continued to improve, specialty technologies such as 65nm advanced process and high-voltage process and analog process could be used for mass production, various advanced packaging technologies such as QFN, BGA and WLP were successfully developed and industrialized, such important equipment as high-density ion etching machine, large tilt ion injector and 45nm cleaning equipment were used on production lines, and critical material technology such as photoresist, packaging materials and target materials made significant headway.

(iii) Industrial structure was further optimized
In China’s IC industry, a pattern featuring the coordinated development of three sectors --- chip design, chip manufacturing, and packaging & testing --- was formed. Sales in the design sector witnessed year-by-year growth from 17.7% of the industry’s total output in 2005 to 25.3% in 2010. Chip manufacturing remained about 1/3 of the IC industry. The IC special equipment, instruments and materials sector has grown to measurable size, effectively sustaining the development of the IC industry as well as solar photovoltaic industry and optoelectronic industry.
(iv) Enterprise strength increased noticeably

Four IC firms ranked among China’s top 100 electronics and IT enterprises. Over 60 IC design firms posted sales of more than RMB 100 million. In 2010, the threshold for cracking the top 10 among design firms was revenue RMB 600 million, more than twice that of 2005. Hisilicon,¹ China’s top-ranking design firm, posted sales of RMB 4.42 billion. Two fabs reported sales of more than RMB 10 billion, and Semiconductor Manufacturing International Corporation (SMIC)², with its 65nm manufacturing process accounting for 9% of total production capacity, remained the fourth largest chip OEM manufacturer globally. Among top-10 packaging and testing firms, Chinese enterprises saw an obvious rise in rankings, and Jiangsu Changjiang Electronics Technology Co.³ ranked among global top ten packaging testing enterprises globally.

(v) Industry concentration effect was more enhanced

Depending upon such advantages as in market, talents and funds, the IC industry in the Yangtze River Delta, Bohai-rim region and Pan-Pearl River Delta continued to grow fast, while 5 national IC industry parks and 8 IC design industrialization bases played a more remarkable role in attracting IC firms and promoting the development of IC industry. As a part of the efforts to develop side regions, Wuhan, Chengdu, Chongqing, Xi’an and other mid-west cities, sticking to distinctive road of development, are playing increasingly important role.

Despite outstanding achievements during the 11th five year period, China’s IC industry still has to face many problems. They include: small size of industry, plus insufficient self-supporting capability, leads to much less market share in domestic market; enterprises, mostly small size and disorderly distributed, have poor sustainable innovation capability and few core technologies, lag much behind foreign advanced levels; poor ability in value chain integration, and failure to build a linkage mechanism between chips and end products, lead to that most of Chinese proprietary chips fail to be used in key end products; unsound industry chain, and lagging behind of special equipment, instruments and materials in R&D.

II. Situation Facing the 12th Five Year Plan

The IC industry is a strategic sector where global major countries or regions strive to gain advantaged position. On the one hand, innovation in this field is still thriving, fine processing technology continues to follow the Moore’s Law, the market competition pattern is accelerating to change, and high concentration of funds, technologies and talents bring tougher challenges. On the other hand, the vitality in

¹ HISILICON’s website: http://www.hisilicon.com/.
³ Jiangsu Changjiang Electronics Technology Co. (JCET) website: http://www.cj-elec.com/enn/
technical innovation, market development capabilities and impetus for resource integration accumulated in China’s IC industry in the past years, as well as vast market potential, have laid solid foundation for the industry to achieve rapid development and climb to new heights in the coming five years.

(i) The rise of strategic emerging industries gives fresh impetus to industry development
The rapid development of strategic emerging industries represented by mobile Internet, 3C convergence, Internet of Things, cloud computing, energy conservation and environmental protection, and high-end equipment nowadays will, following the computer, network communication and consumer electronics, become new drivers to promote the development of IC industry, while the convergence of multi-technology and multi-applications give birth to new IC products. In the past five years, China’s IC market grew at an annual average rate of 14%, to RMB 734.95 billion in 2010. By 2015, the domestic IC market is expected to exceed RMB 1 trillion. A vast multi-level market has provided ample space for the growth of domestic IC firms. The trends of further division of labor on the global industry chain bring opportunities for emerging countries to enter global market segments.

(ii) IC technology evolution routes are getting increasingly clear
On the one hand, pursuing lower power consumption, higher concentration and smaller size still remains the focus of technological competition, and SoC design technology has become a dominant one. Chip integration has continued to improve, and will still follow the Moore’s Law. Currently, the 32nm process has seen mass production internationally, and the 18nm process will be introduced in 2015. On the other hand, it has become an obvious trend that products are having diverse functions; while seeking to make circuit width narrower, various mature and specialty manufacturing processes are used to adopt advanced packaging technologies such as System in Package (SiP) and package on package and achieve the integration of more digital functions and non-digital ones. In addition, IC technology is anticipating new major breakthroughs. New materials, new structures and new processes will help break through the physical limit of the Moore’s Law, and support microelectronic technology to continue to develop.

(iii) The competition landscape in global IC industries continues to see profound changes
Currently, the global IC industry has entered a major period of adjustment, and major countries/regions all accelerate their efforts to develop the IC industry with a view to gain strategic advantaged position in emerging industries, and invest large numbers of innovation factors and resources. After the financial crisis, Intel, Samsung, Texas Instruments and TSMC accelerated the introduction of advanced processes, sped up their efforts in resource integration and reorganization, continued to expand production capacity, strengthen the control of core sectors in the industry chain and integration of upstream sectors with downstream sectors,
aiming eagerly to increase their lead on their rivals. Further raising the threshold for market access brings tougher challenges for domestic IC firms with insufficient resource factors and innovation factors.

(iv) Innovation of business models brings opportunities to the industry in new round of competition

The content of innovation continues to be enriched, and innovation of business models has become important choice for enterprises to acquire competitive edges. Currently, the development of SoC integrating software with hardware, nano-level processing and high-density packaging raise higher requirements for IC firms’ ability to integrate upstream and downstream sectors of industry chain and ecological chain, promoting the rising of the virtual integrated device manufacturer (IDM) model. In particular, with the development of emerging fields such as mobile Internet terminals, new business models such as Google-ARM and Apple emerge, while existing WINTEL System has been challenged.

(v) Implementation of new policies creates more favorable environment for the development of industry

The continued implementation of national key science & technology projects during the 12th five year period, new requirements for developing strategic emerging industries will push forward breakthroughs in IC core technologies, and continuously promote the development of IC industry. The Circular of the State Council on Printing and Distributing the Policies Further Encouraging the Development of Software Industry and Integrated Circuit Industry (No. (2011) 4 issued by the State Council) inherited most provisions of the Circular of the State Council on Printing and Distributing the Policies Encouraging the Development of Software Industry ad Integrated Circuit Industry (No. (2000) 18 issued by the State Council), further increased efforts to support the IC industry, and expanded the scope of support granted to enable the preferential policies to cover various sectors of the industry chain. The industry’s development environment will be further optimized.

III. Guidelines, General Principles and Development Goals

(i) Guidelines and general principles

Thoroughly apply the scientific outlook on development, aim at changing the economic growth pattern and adjusting the economic structure, adhere to the principles of “applications-oriented, innovation serves as driver, coordinated promotion, guide the development”, make breakthroughs in generic and critical technologies and key products, boost the core competitiveness of the industry; optimize the industrial structure, extend and improve the industry chain; make greater efforts to integrate and optimize resources, and cultivate large enterprises with international competitiveness; implement industrial policies, build a sound public service system for the industry; boost the quality and benefits of developing
the industry, and get deeply involved in further division of labor of international industry chain, and enhance the abilities to supply products in China; optimize the industry’s ecological environment, build a large industry chain incorporating chips and end products, and provide strong support for industrial transformation and improvement, IT application efforts and national information security assurance.

**Adhere to the “applications-oriented” principle.** Under the guidance of major demand for IT application efforts as well as end products, develop a number of distinctive, special IC products that could be widely used. In key fields and critical sectors, the government should develop plans to lead the development efforts, figure out preferential policies, and make organizing and coordination efforts.

**Innovation serves as driver.** Through working on national key science & technology projects and major projects, driven by technological innovation, innovation in business models and institutional innovation, make breakthroughs in a number of generic and critical technologies. Enhance reinnovation efforts on the basis of introduction and assimilation, and follow the path of open innovation and international development.

**Adhere to the “coordinated promotion” principle.** Adjust and optimize industrial structure: concentrate on developing the chip design sector, expand chip manufacturing, while boosting the levels of packaging & testing, and enhance the abilities to develop and supply critical equipment, instruments and materials independently. In light of the principles of “support excellent firms, support strong firms and support large firms”, optimize organizational structure of enterprises, and push forward acquisition & merger, reorganization and association of enterprises. Optimize regional layout, and eliminate low-level redundant development.

**Adhere to “guiding the development”**: Combine enlarging the size with boosting the competitiveness, give full play to leading role of IC industry, promote the R&D and industrialization of critical technologies in strategic emerging industries, and support the transformation and improvement of traditional industries.

(ii) Development goals
By the end of the 12th Five Year period, the size of the industry will more than double, accompanied by breakthroughs made in critical core technologies and products, remarkable achievements in restructuring, further improvement of industry chain, and formation of a number of enterprises with international competitiveness, leading to the establishment of a technical innovation system under which enterprises play an important role and which combines the efforts of enterprises, universities, research institutes and users.

1. Main economic indexes
IC output will exceed 150 billion units, sales will reach RMB 330 billion, an annual average 18% growth, accounting for about 15% of the world IC market, satisfying nearly 30% of domestic market demand.

2. Goals for restructuring

**Industrial structure**: Sales in the chip design sector will increase to about 1/3 of the whole industry’s total, and the chip manufacturing, and packaging & testing will account for about 2/3 of the whole industry, forming a balanced development pattern. Special equipment, instruments and materials will play a further enhanced role in supporting the development of IC industry.

**Enterprise structure**: Cultivate 5-10 key design firms posting sales of over RMB 2 billion each, with one firm ranking among the global top ten design firms; cultivate 1-2 key chip manufacturers posting sales of over RMB 20 billion; and 2-3 key packaging & testing firms posting sales of over RMB 7 billion, ranking among the global top ten in packaging & testing sector. Build a number of small and medium-sized enterprises with strong innovation vitality.

**Regional structure**: Stick to reasonable regional layout, continue to strengthen the industrial layout formed of three industry concentration zones including the Yangtze River Delta, Bohai-rim region and Pan-Pearl River Delta, with Chongqing, Chengdu, Xi’an and Wuhan as side regions, and build a number of industry concentration zones with improved industry chain, strong innovation capability and distinctive characteristics.

3. Goals for technical innovation

**Chip design sector**: Advanced design capability will reach 22nm, develop a number of core chips with Chinese intellectual property, over 30% of IC products developed by Chinese enterprises independently will be used in domestic key end-product applications.

**Chip manufacturing sector**: Large-scale production technology will improve to 12 inch, 32nm manuacturing process, gradually introduce 28nm process. Master such specialty process technology as advanced high voltage process, MEMS process and SiGe process.

**Packaging & testing sector**: Enter international mainstream fields, further improve technical levels of flip chip bonding (FC), BGA, chip scale package (CSP) and multi-chip package (MCP), strengthen development efforts for new-type packaging & testing technology such as SiP and high-density 3D packaging, and achieve large-scale manufacturing.

**Special IC equipment, instruments and materials**: Critical equipment will reach the levels of 12 inch and 32nm process, 12 inch monocrystalline silicon and epitaxial wafers can be mass manufactured; critical materials will be used in the chip manufacturing process, and can be mass manufactured.

**IV. Main Tasks and Priorities**
(i) **Main tasks**

1. **Concentrate force, pool resources, and make breakthrough in R&D of a number of generic critical technologies and key products**
   
   Strengthen top-tier design and overall arrangement, and in light of national strategy and key demand for end products, aim at the industry’s generic critical technologies and key products, lead and support the efforts to, depending upon organizations with competitive edges, build an open IC technology innovation platform which combines the efforts of enterprises, universities, research institutes and users. Focus on developing generic critical technologies in various sectors of industry chain such as SoC design, nano-level manufacturing process, advanced packaging & testing, advanced equipment, instruments and materials, and implement a number of key product projects. Improve the mechanism for investment in technical innovation, innovation R&D, and conversion and application of technical achievements, strive to make major technical breakthroughs in key fields, foster a number of sophisticated products with high added value, and build a market-oriented technical innovation system under which enterprises play an important role and which combines the efforts of enterprises, universities, research institutes.

2. **Grow key enterprises to be strong and excellent, and boost core competitiveness of enterprises**
   
   Increase the allocation of factor resources and policy support, optimize the allocation of industry resources, and promote the association of competitive enterprises, inter-regional enterprise acquisition and merger, overseas acquisition and merger and cooperation by way of investment. Promote diverse forms of enterprise integration, encourage integration of similar enterprises, integration of upstream enterprises with downstream enterprises, and integration of end product manufacturers with IC firms, cultivate some design firms, manufacturers, packaging & testing firms and equipment, instruments and material enterprises with international competitiveness, foster a number of small and medium-sized enterprises with professional, sophisticated, distinctive new-type products, and strive to build an industrial organizational structure under which large enterprises and SMEs complement each other and achieve coordinated growth.

3. **Improve the ecological environment for the industry, and build a large industry chain for chip and end products**
   
   Promote collaborative development and industrialization efforts with respect to defining of products and design, manufacturing, packaging & testing of chips, implement a couple of comprehensive projects covering IC, software, end product, system and applications, and build an industrial ecological symbiosis chain/value chain. Encourage chip design firms to strengthen cooperation with end-product manufacturers, promoting effective R&D in chip design through upgrading of end products, and boosting the competitiveness of end-product system through innovations in chip design. Under the guidance of the government, give play to the
role of market mechanism, actively explore and implement virtual IDM model, work together on building a value chain, create a favorable ecological environment for the industry, and enable upstream and downstream enterprises to make breakthroughs and improve collectively.

4. Improve and strengthen multi-level public service system, and promote sustained and rapid development of industry
In light of the industry’s major innovation requirements, apply open development theory, pool competitive resources, and build industry-oriented national IC R&D centers operating as an enterprise and combining the efforts of enterprises, universities, research institutes and users, focusing on developing generic critical technologies in various sectors of industry chain such as SoC product design, nano-level manufacturing process, advanced packaging and testing, so as to provide technical support for sustained development of the industry. Support the consuction of IC public service platforms, so as to provide product development and testing environment for enterprises, as well as application & promotion services, promote the growth of SMEs, and make it a platform for building communication between chip makers and end product manufacturers.

(ii) Priorities
1. Concentrate efforts to develop the chip design sector, and develop high performance IC products
In light of application requirements in strategic emerging industries and key fields such as mobile Internet, information-based household appliances, 3C convergence, Internet of Things, smart grid and cloud computing, innovate pattern of organizing projects, and driven by end-product system, make breakthrough in high-end general-use chips for CPU/DSP/memory, focus on developing widely used chips such as network communication chips, digital-analog chips, information security chips, digital TV chips, RFID chips, sensor chips, as well as special IC products in key fields with respect to integrating informatization with industrialization, and key fields of strategic emerging industries, and cultivate abilities to develop solutions. Support the development of advanced electronic design automation (EDA) tools, and build demo platforms for promotion of EDA applications.

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<th>Column 1: Chip and end-product value chain joint construction project</th>
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<td><strong>High-end general-use chip</strong>: Strengthen research efforts in the design of architecture, algorithms and hardware-software collaboration, develop high-end general-use chips for supercomputer and server CPU, desktop/laptop computer CPU, very low power consumption, high performance embedded CPU and high performance DSP, dynamic random access memory (DRAM), apply them in the Party and state organs and army as well as IT applications in major sectors, and cultivate industrialization capabilities and abilities to participate in market competition.</td>
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SoC chip for mobile smart terminals: Be oriented to the mobile smart terminal market represented by tablet computers and smart mobile phones, on the basis of very low power consumption, high performance embedded CPU, follow the path of software-hardware collaboration, worldwide compatibility and independent development, develop the SoC product platform for mobile smart terminals, make breakthroughs in multi-mode Internet access, multi-applications, system-level low power consumption design technology, and build a complete ecological chain for the mobile smart terminal industry.

Network communication chip: Aiming at the industrialization of TD-LTE, develop TD-LTE terminal baseband chips and terminal RF chips, boost the capability of TD-LTE and most important sectors of its enhanced industry chain, build a sound industrial ecological chain/value chain ranging from chip and mobile operating system to brand handset type. Develop critical chips for digital cluster communication, short-distance broadband transmission chips and optical communication chips.

Digital TV chip: Following the trends of 3C convergence, terminal convergence and content convergence, focus on making breakthroughs in new-type SoC architecture for digital TVs, image processing engine, multi-format video decoding, conversion of video format, 3D display processing technology, etc. Continue to boost chip design and manufacturing levels in the field of satellite direct broadcast and terrestrial transmission.

Chip for smart grid: In light of the requirement for construction of smart grid, develop chips used for power transmission and transformation systems of smart grid, the system for connecting new energy to grid, energy conservation control modules of motors, and modules for transmission control with respect to billing of electric meters.

Chips for information security and video monitoring: Develop information security special chips for safe storage, encryption and decryption, boost the chip’s operational speed and anti-attack capabilities, promote the hardware implementation of information security functions; meet the requirement for development of safe cities, and develop SoC chips for video monitoring.

Chips for auto electronics: Serving the needs of auto electronic information platform, and aiming at core chips for auto control system and onboard information system, develop chips for auto audio and video/information terminals, chips for power control and management, and chips for car body control. Responding to needs for development of new energy automobiles, develop chips and modules for motor driver and control, power storage, and management of charging and discharging.

Bank IC card/RFID chips: Follow the trend of shifting of bank cards from magnetic card to IC card, develop bank IC card chips that could satisfy the requirements of bank IC cards for electrical performance, reliability and safety, are based on indigenous innovation, comply with relevant technical standards and application standards, and support multi-applications, and build a bank IC card chip test and certification center. Develop superhigh-frequency RFID chips, and satisfy
the needs for the development of Internet of Things.

**Chips for numerical control/industrial control devices:** Develop MCU series chips widely used in control of household appliances, control of transmission of billing information for water gauge, control of production process, and smart control for medical equipment. Strengthen the R&D of applications, enhance capabilities to provide development tools. In light of actual application needs, launch chip projects such as high-end DSP, AD/DA, field programmable gate array (FPGA).

**Chips for smart sensors:** Aiming at the Internet of Things applications, select smart sensor chips having intended actual uses, develop technologies for integration of smart sensor with node processor, very low power consumption design technology, information pre-processing technology, etc.

2. Expand the size of the chip manufacturing sector, and enhance advanced and specialty process capabilities
Continue to support technical upgrading and capacity expansion of 12 inch advanced process manufacturing lines and 8 inch/6 inch specialty process manufacturing lines. Accelerate the R&D and application of 45nm and less manufacturing process technology, and strengthen the development of standard process and specialty process modules and IP core. Attract source-diverse investments in the IC sector, and encourage industry resources to concentrate in enterprises and regions having infrastructure and mature conditions, form the scale economy effect, and promote the scientific development of IC chip manufacturing lines.

**Column 2: Advanced process/specialty process production line construction and capacity building project**

**Development of advanced process and construction of production lines.**
Accelerate large-scale and intensive construction of 12 inch advanced process production lines. Stick to the principle of internationalization, adopt the mode of openness and cooperation, promote the R&D and industrialization of 45nm/32nm/28nm advanced processes, so as to lay foundation for R&D and mass production of 22nm products, thus greatly narrow the gap between domestic technology and international levels, and build a professional OEM sector with international competitiveness and sustainable development capability.

**Development of specialty process and construction of production lines.**
Support the development of specialty processes such as analog process, digital-analog process, MEMS process, RF process and power device process, promote the construction of distinctive process production lines. Accelerate the development and industrialization of manufacturing process based on strained silicon, silicon on insulator, and compound semiconductor material.

3. Boost levels and capabilities of the packaging and testing sector, and develop advanced packaging and testing technologies and products
Following the important development trend of IC products moving toward
diversified functions, make vigorous efforts to develop advanced packaging and testing technologies, promote the process of high-density package-on-package 3D packaged product, and support the technical upgrading and capacity expansion of the packaging process. Improve testing technical levels and enlarge the industrial size.

4. Improve the industry chain, and make breakthroughs in R&D of critical special equipment, instruments and materials
Promote the industrialization process of 8 inch IC equipment, support the R&D of 12 inch IC manufacturing equipment, strengthen the development of new equipment, new instruments and new materials, form complete set of technology, promote large-scale application of homegrown equipment on the production lines, cultivate a number of key enterprises with strong indigenous innovation capability, push close collaboration among various sectors (design, manufacturing, packaging & testing, equipment, instruments and materials) of the IC industry chain, build test platforms, and accelerate industrialization efforts.

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<th>Column 3: IC industry chain extension project</th>
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<td><strong>Advanced packaging &amp; testing.</strong> Support the development and application of advanced packaging and testing technologies such as BGA, CSP, multi-chip module (MCM), WLP, 3D and Through silicon vias (TSV), and promote the process of IC products such as MCP, SiP, package in package (PiP) and package on package (PoP) especially high-density PoP packaged products.</td>
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<td><strong>Special equipment, instruments and materials.</strong> Support the development and application of such equipment as etching machine, ion injector, epitaxial furnace equipment, flattening equipment, and automatic packaging system, form complete set of technology, strengthen the R&amp;D and industrialization of critical materials such as 12 inch silicon wafer, SOI, lead frame, photoresist, and support large-scale application of domestic IC critical equipment, instruments and materials on production lines.</td>
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V. Policy Measures

(i) **Implement policies and regulations, and improve public service system**
Implement the State Council document No. (2011) 4, and accelerate the development of relevant implementation rules and supporting measures. Strengthen industry survey and investigation efforts, and adjust the Catalogue of Productive Raw Materials and Consumables Exempt from Duties When Imported by IC Firms for Own Use at due time. Further improve the legal system on the development of IC, improve the public service system for the IC industry, strengthen the efforts to build public service platforms, and promote close ties between design and application.
(ii) Improve the efficiency in use of financial funds, and expand channels of investment and financing
Elaborately organize and implement national key science & technology projects and strategic emerging industry innovation projects, make breakthroughs in critical core chips of important end-product system, and support and plan pre-study of new devices, new principles and new materials. Through such channels as technical upgrading funds, special funds for IC research & development and Electronic Information Industry Development Fund, continue to support the efforts to boost indigenous innovation capability and core competitiveness of IC industry. Encourage national policy-based financial institutions to support key IC technical upgrading projects, technical innovation projects and industrialization projects. Encourage large enterprise groups in various sectors to acquire stakes in IC firms or merge them. Support IC firms in their IPO efforts at home and abroad for raising funds, and encourage financial and securities institutions to actively support the development of IC industry, and support qualified innovative SMEs to go public at the SME Market and Growth Enterprise Market. Encourage domestic and foreign economic organizations and individuals to invest in IC industry.

(iii) Push forward integration of resources, and foster large enterprises with international competitiveness
According to the principles of strategic coordination and effective allocation of resources, promote acquisition & merger and reorganization of enterprises of various ownership systems in a law-compliant way. Through setting up leading funds, investing directly, granting finance discount on loans, and reduction and exemption of relevant expenses, eliminate disorderliness and redundancy, promote integration of enterprises, optimize enterprise structure, enhance concentration of the industry, and generate a number of large enterprises following the development trends of major products and key processes, to adapt to the needs of new industry development situation and international market competition. Promote close collaboration among the government, banks and enterprises, mobilize, guide and exploit relevant resources, extensively build project development platforms under which banks and enterprises cooperate, and push the cooperation among the government, banks and enterprises to move forward. Support the development of industry alliance, leverage the horizontal alliance to tackle key technical problems, and leverage the industry chain alliance to accelerate industrialization process and promote the establishment of application market.

(iv) Continue to expand openness to outside world, and improve the quality in utilizing foreign investments
Stick to openness up to outside world, continue to optimize the environment, make greater efforts to attract foreign (overseas) investments, technologies and talents, and move gradually toward the high end of international industry chain. Attract multinationals to set up R&D center, production centers and operation centers in China. Encourage their research teams in China to increase research spending and
introduce high-end R&D projects, and push foreign-funded R&D teams to cooperate with local organizations. Improve the procedures for approval of foreign investment projects, and adjust the Foreign Investment Guide Catalogue, and guide the foreign investments. Encourage enterprises to expand international cooperation, integrate and acquire and merge international resources, set up overseas R&D centers, and actively develop international markets.

(v) Strengthen talent training efforts, and introduce overseas talents vigorously
Build a sound IC talent training system, accelerate efforts to establish and develop microelectronics schools and microelectronics vocational training institutions, form a multi-level contingent of professionals, and focus on training high-level inter-disciplinary IC professionals with international vision; increase efforts to introduce international talents, and create favorable policy environment, and make vigorous efforts to introduce excellent foreign IC professionals; introduce a mechanism encouraging competition, and develop incentive policy and income-distribution mechanism that can spark creativity of talents. Pay attention to cultivation of favorable environment, and strive to build a large contingent of entrepreneurs with pioneering spirit and international vision.

(vi) Implement an intellectual property strategy, and enhance efforts to protect intellectual property
Implement intellectual property strategy vigorously, and develop a number of critical technologies with Chinese intellectual property in key technical fields; encourage enterprises to apply for registration of IC layout designs, and strengthen effective utilization of exclusive rights to IC layout designs; in science & technology projects, solicit public comments on intellectual property rights, and increase efforts to protect intellectual property, and promote fair and orderly development of the market; encourage industry associations and enterprise-university-research institute-user alliances to conduct an analysis of patent landscape, and build a early warning mechanism with respect to intellectual property, and through communication and cooperation in intellectual property, promote the development of the integrated circuit industry.