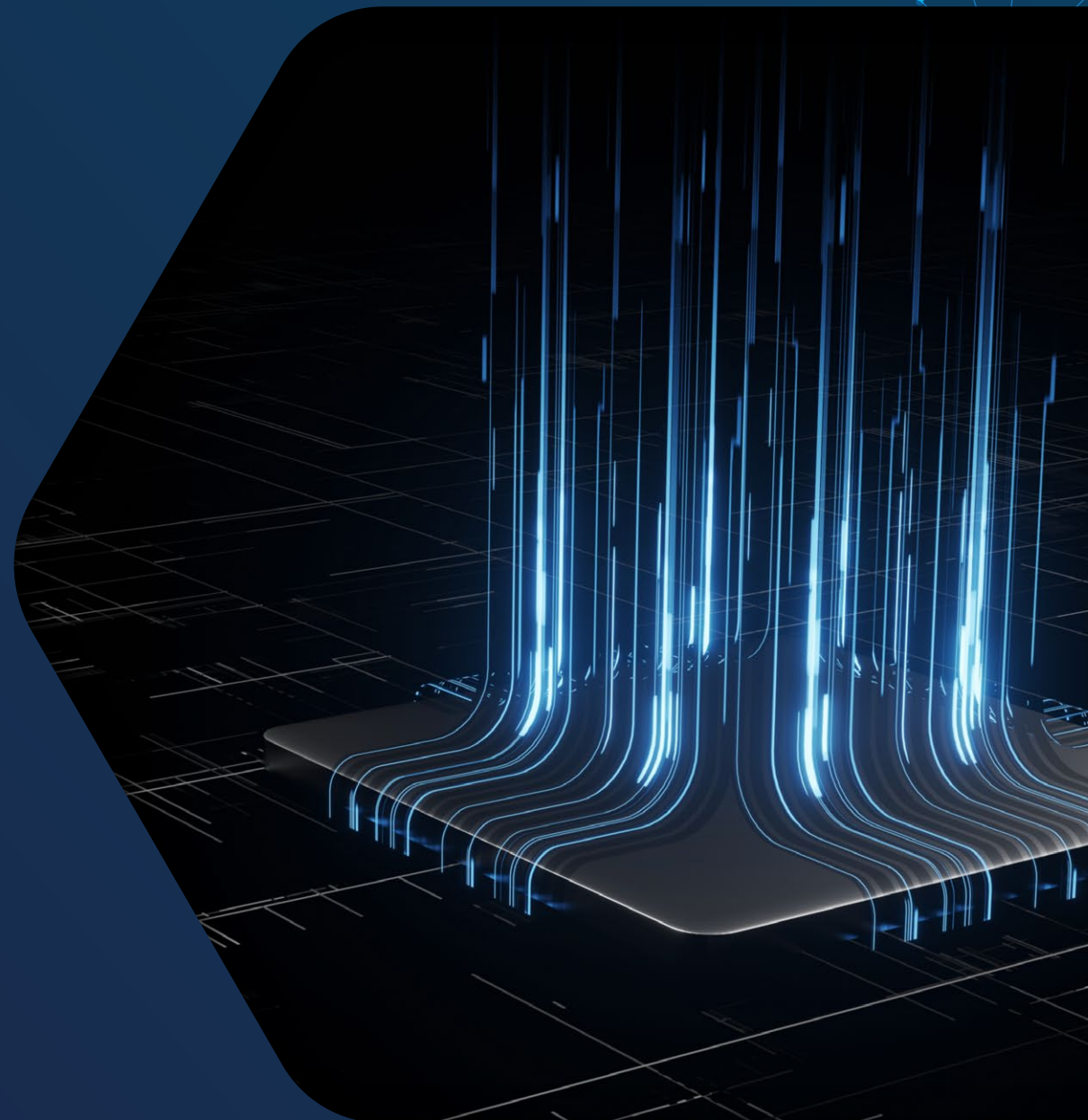


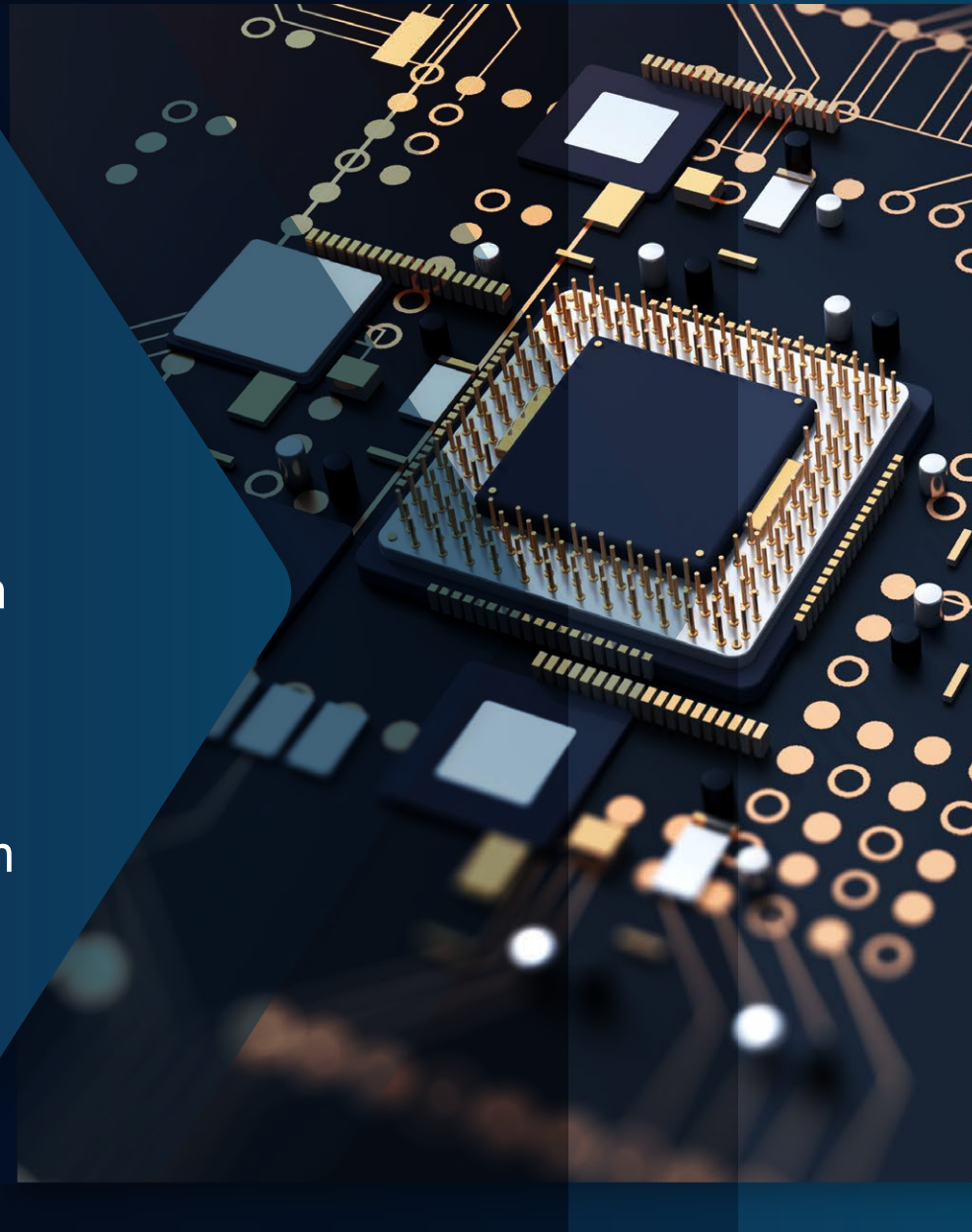
Imports of electronics, electrical equipment and their components into the Russian Federation

Electronic integrated and printed circuits



Contents

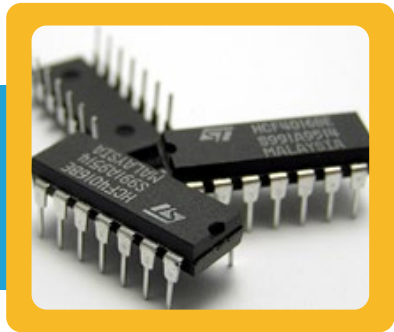
- What are integrated and printed circuits?
- Global market for integrated circuits
- Production of circuits in the Russian Federation
- Import of circuits to the Russian Federation
- Sanctions policy against the Russian Federation





What are integrated and printed circuits?

Circuits are the main elements of modern electronics, and their introduction allowed to reduce product size and simplify manufacturing technology. Circuits removed many supplementary conductors and other parts from electronics, simplified the labor-consuming manual assembly, and reduced the number of soldered joints. Mass production of circuits made it possible to automate manufacturing, increasing product uniformity and reliability.



Integrated circuits (microcircuits, chips)

Semiconductor crystals or small-sized films containing electronic circuits; are used in all types of modern electronic equipment as their functional component.

Types

- Analog ones are designed to process and convert analog signals, including the amplification, comparison, multiplication, limiting, and frequency filtering functions.
- Digital ones are intended to process and convert digital signals, implement logical and arithmetic operations, and digital information storage operations.
- Mixed ones include features of the previous two types.

Repairability

Cannot be repaired due to the small size of components and connections.

Production of integrated circuits

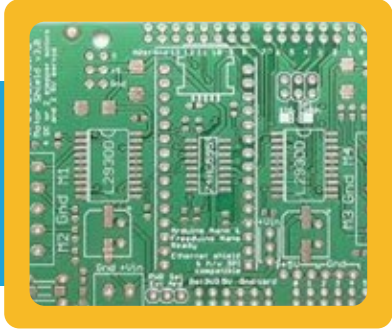
- 01 » Producing silicon by heating the silica sand with a reducing agent, carbon
- 02 » Silicon purification until ultrapure electronic-grade silicon (EG-Si) is obtained
- 03 » Placing a small seed crystal in contact with the surface of molten EG-Si for growing cylinder-shaped crystal
- 04 » The cylinder is sliced into wafers less than a millimeter thick
- 05 » The wafer surfaces are polishing atomically smooth
- 06 » Physiochemical processing of wafers before turning them into chips
- 07 » Creating electronic components on the backing of the wafer, adding layers to connect these components:
 - creation of logic gates in the lower layer;
 - connection of logic gates in the following layers to create building blocks;
 - connection all the blocks to create complete integrated circuits.
- 08 » Cutting wafers into individual circuits by a diamond cutter
- 09 » Integrated circuits are encapsulated with polymeric materials to protect them from air (oxidation), moisture, and mechanical assault



What are integrated and printed circuits?

Printed circuits (boards)

A board or plate consisting of one or more conductive patterns on the surface of a dielectric substrate. The pattern represents the conducting lines (e.g., copper tracks) connecting the individual mounted components. It has through-holes or holes for non-surface mounted components and a legend (a set of marks and characters to identify parts and facilitate maintenance).



Types

- Single-sided ones have foil with conductors only on one side of the substrate.
- Double-sided ones have foil layers on both sides of the substrate, providing a higher density of mounting and fastening.
- Multi-layer ones have several layers of substrate plates connected through metalized holes in the electrical circuit, providing higher performance but also higher cost and requiring more advanced manufacturing.

Repairability

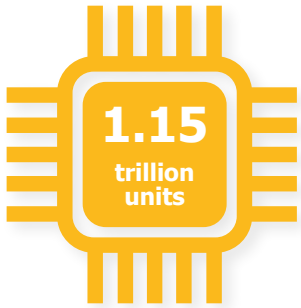
Can be repaired by replacing damaged components or by restoring the connection.

Production of printed circuits

- 01» Designing the PCB layout and exporting it into format supported by a manufacturer
- 02» Writing design imaging onto the film with a laser
- 03» Drilling holes for mounting holes, through-hole pins, and vias
- 04» Cleaning and polishing the surface
- 05» Applying a copper layer
- 06» Applying a photo-sensitive film (photoresist)
- 07» Applying tin to protect copper
- 08» Removal of unprotected and unwanted exposed copper
- 09» Quality control and errors correction
- 10» Solder mask application and silk-screening
- 11» Protective coating
- 12» Cutting the PCBs out of the production panel
- 13» Testing and quality assurance



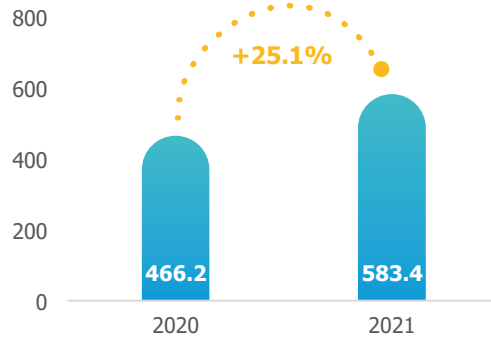
Global market for integrated circuits



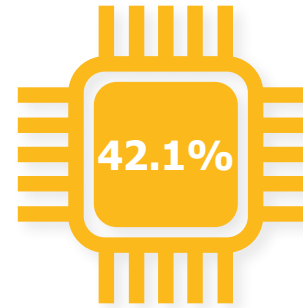
Number of chips sold worldwide in 2021

Worldwide sales of chips

billion USD



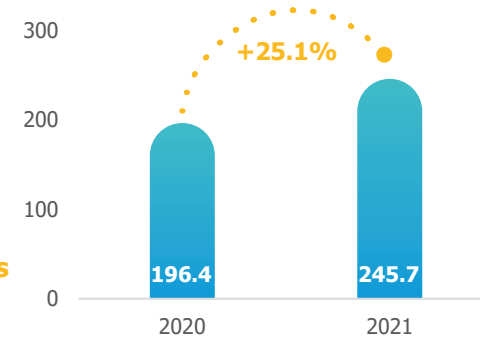
Source: Tadviser



Share of the top-10 buyers in global chip purchases

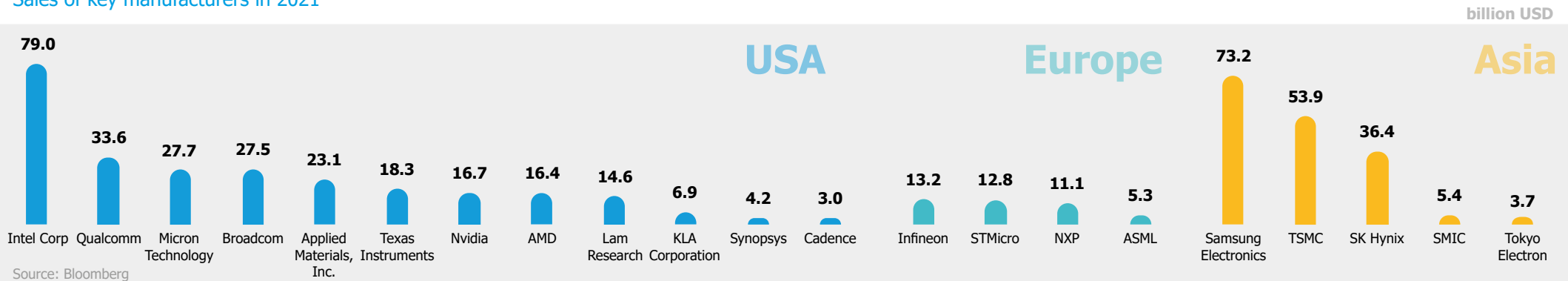
Chips procurement costs of the top-10 buyers

billion USD



Source: Tadviser

Sales of key manufacturers in 2021



Source: Bloomberg

Key challenges of the industry

Cessation of neon exports from Ukraine

Neon is a raw material for circuit production. By the outbreak of the war, Ukraine concentrated up to 40% of the world's neon production. China can replace Ukrainian exports, but this will lead to a significant increase in prices.

Increased manufacturing wait time for chips

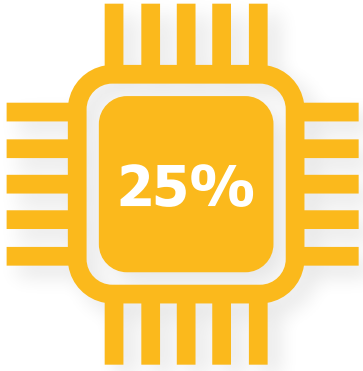
At the beginning of 2021, the time between order and delivery of the chip was about 13 weeks; by the end of the year, it had grown to 18 weeks.

Shortage of circuits

Soaring costs and waiting times for production will exacerbate circuit shortages, which in turn will slow the pace of electronics manufacturers.



Production of circuits in the Russian Federation



Share of the domestically manufactured integrated circuits in the Russian Federation consumption

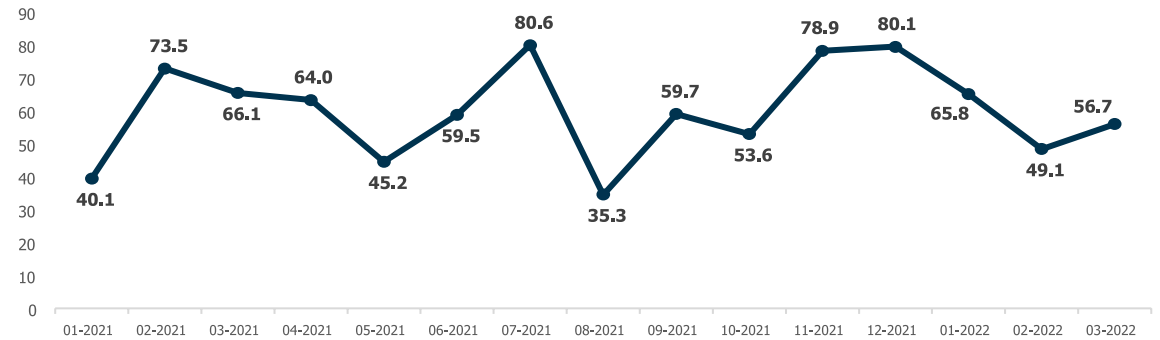
Source: J'son & Partners Consulting

The Russian Federation can manufacture integrated circuits and printed circuits domestically; however, it cannot fully meet the country's needs. J'son & Partners Consulting analysts point out that the country has at least five plants for the production of integrated circuits, the largest of which is Mikron JSC.

At the same time, imports cover 75% of the country's needs in integrated circuits. The USA used to supply the most advanced solutions.

Production of integrated electronic circuits (HS 8542)

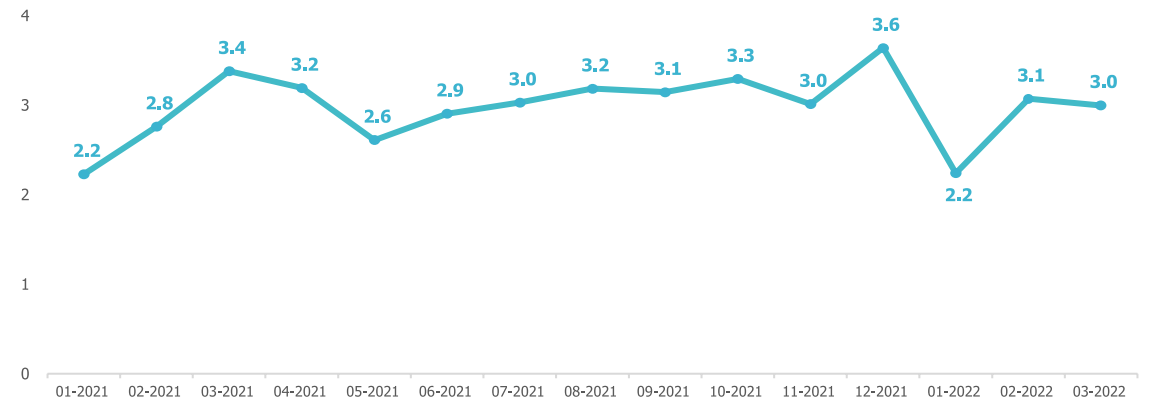
million units



Source: Federal State Statistics Service of the Russian Federation

Production of printed circuits (HS 8534)

million units



Source: Federal State Statistics Service of the Russian Federation



Import of circuits to the Russian Federation

2021

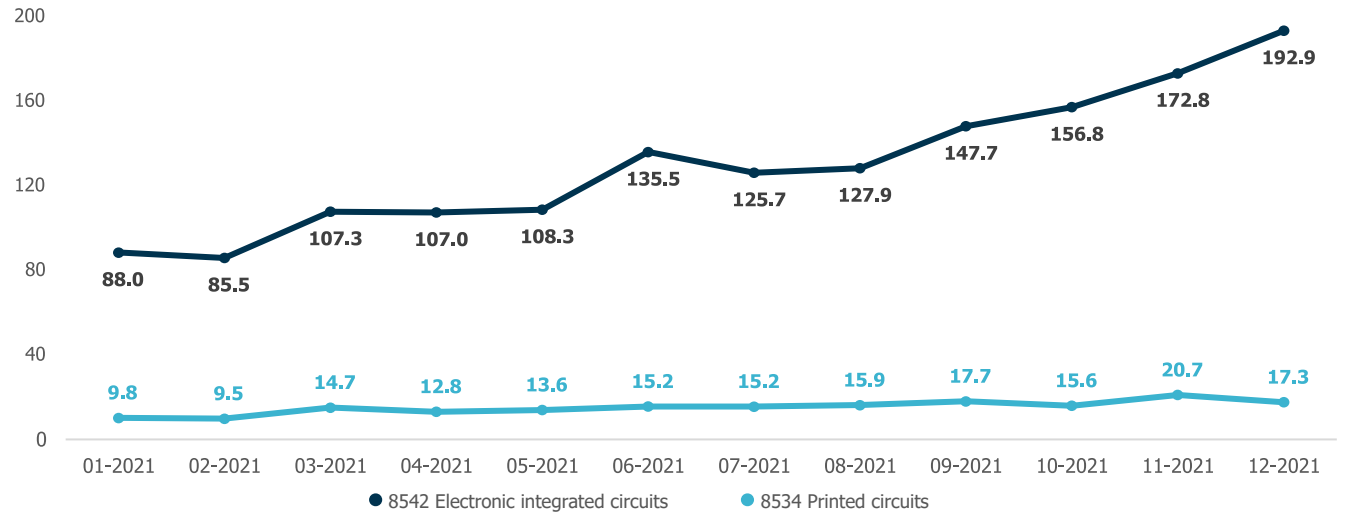
1.7 billion USD The amount of imports of integrated and printed circuits (HS 8542 and 8534)

4.5% The share of circuits in total imports of electronics (HS 85)

79% The share of the top-5 countries in the import of integrated and printed circuits (HS 8542 and 8534)

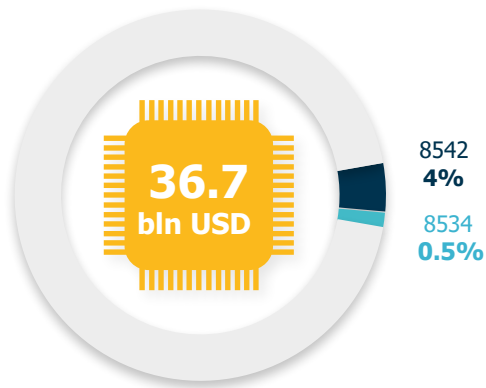
Import of integrated and printed circuits into the Russian Federation (HS 8542 and 8534)

million USD



Source: Federal Customs Service of the Russian Federation

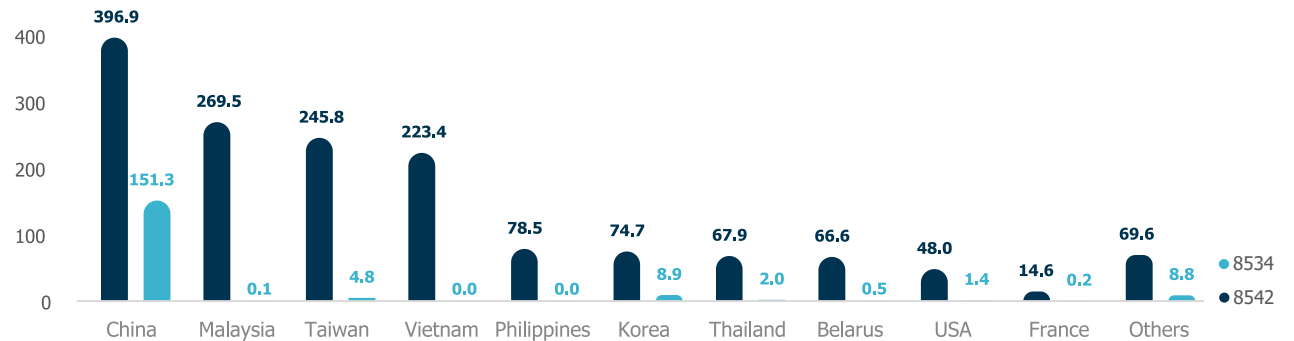
The share of integrated and printed circuits (HS 8542 and 8534) in Russian imports of electronics (HS 85)



Source: Federal Customs Service of the Russian Federation

Geographical spread of integrated and printed circuits imports into the Russian Federation (HS 8542 and 8534)

million USD



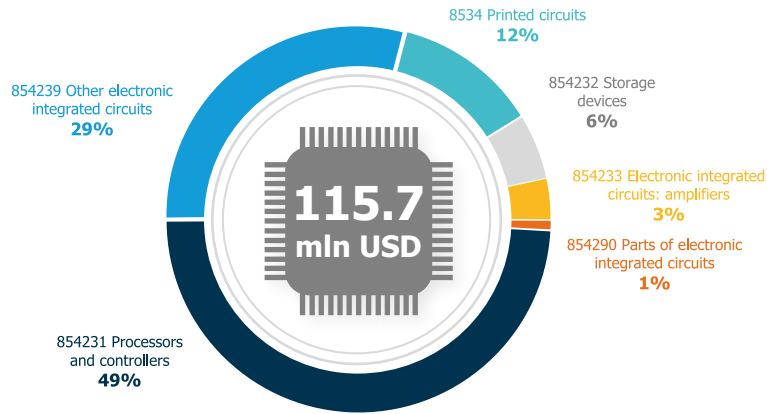
Source: Federal Customs Service of the Russian Federation



Import of circuits to the Russian Federation

January 2022

Goods composition of integrated and printed circuits imports (HS 8542 and 8534)

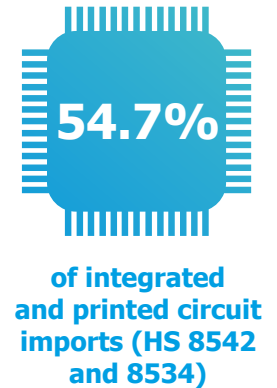
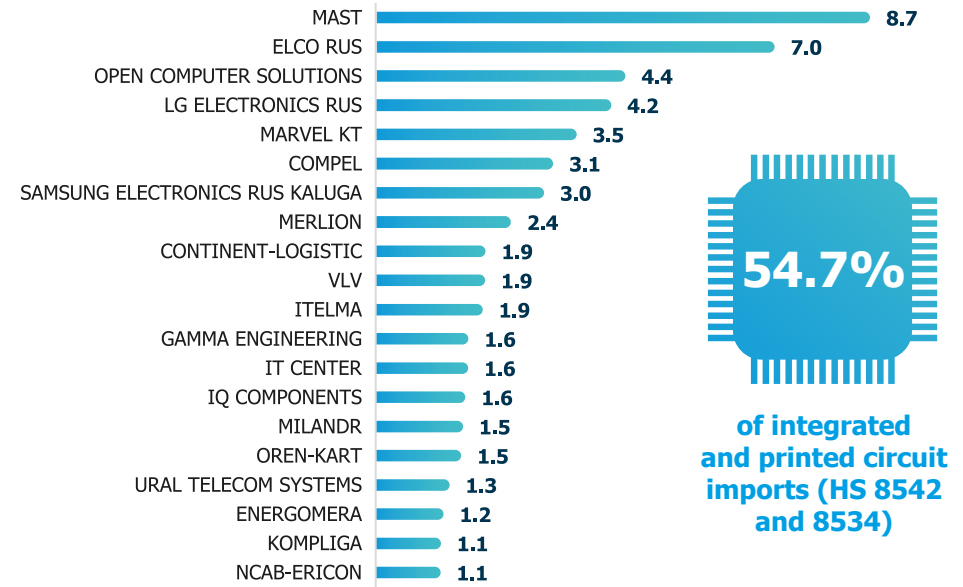


Source: Trade Intelligence Data Platform, Market Inside

In January 2022, the Russian Federation imported integrated and printed circuits worth 115.7 million USD, 18% more than it did a year earlier in 2021. The primary supplier countries were Hong Kong and China (a combined 44% of total circuit imports). The top-20 importing entities accounted for more than half of the purchases.

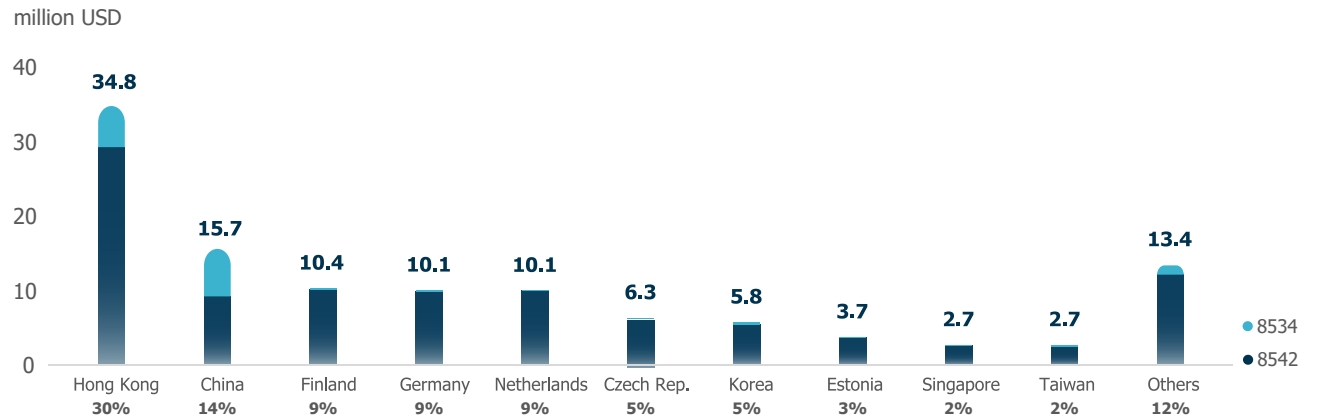
Note that official information sources ceased publishing statistics on Russian Federation imports in February 2022.

Major importing entities for integrated and printed circuits (HS 8542 and 8534)



Source: Trade Intelligence Data Platform, Market Inside

Geographical spread of integrated and printed circuits imports (HS 8542 and 8534)



Source: Trade Intelligence Data Platform, Market Inside



Sanctions policy against the Russian Federation

In the modern context, electronics, electrical equipment, and their components are vital to a country's functioning. Telecommunications, the production of modern household appliances and vehicles, electronic financial systems, and many other things depend on them. Restricting the supply of such products to the Russian Federation would further weaken its economy, cut it off from the modern world, and prevent it from independently producing various goods whose supplies have stopped due to the sanctions.

Numerous companies have already imposed restrictions on selling their products in the Russian Federation, including tech leaders such as Apple, Dell Technologies Inc, Cisco, AMD, Intel, Samsung Electronics, Canon, HP, Nvidia, Ericsson, Nokia, IBM, and TSMC.

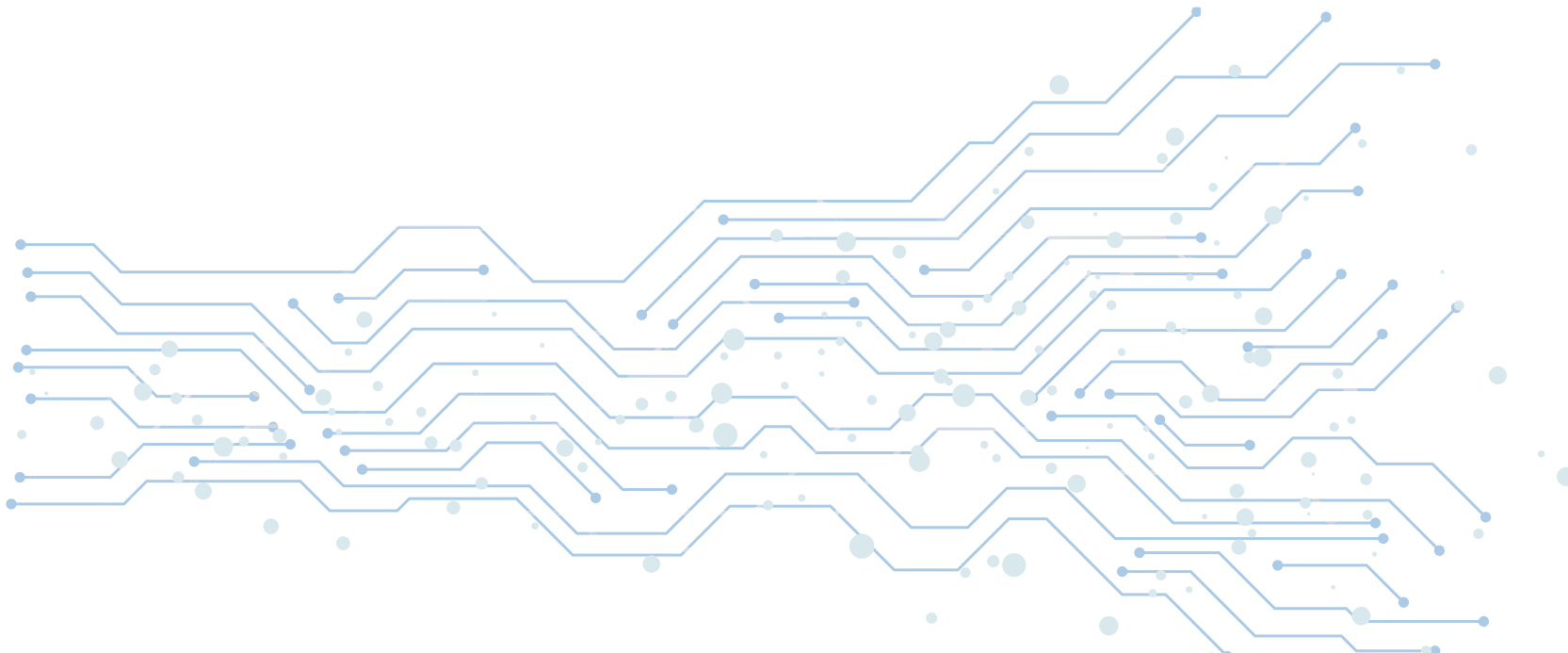
The EU and US sanctions have also become quite severe as these countries have banned exports to the Russian Federation for a wide range of high-tech components. Among them are semiconductors, telecommunications equipment, software (i. a., for encryption), lasers, aviation and space systems, and oil refining equipment. Notably, the US also bans the export of any product created using US software or equipment from anywhere in the world.

The fifth package of sanctions, adopted in April 2022, will deal a tangible blow to Russian microchip production. Imported ultra-pure silicon is essential for Russia

to produce microchips domestically, even while employing outdated 90+ nm manufacturing processes. After introducing the fifth package of European sanctions, China remains the only supplier of this material. Of course, Russia has its own deposits of silicon and companies capable of processing it, but Russia is unable to substitute imported material completely.

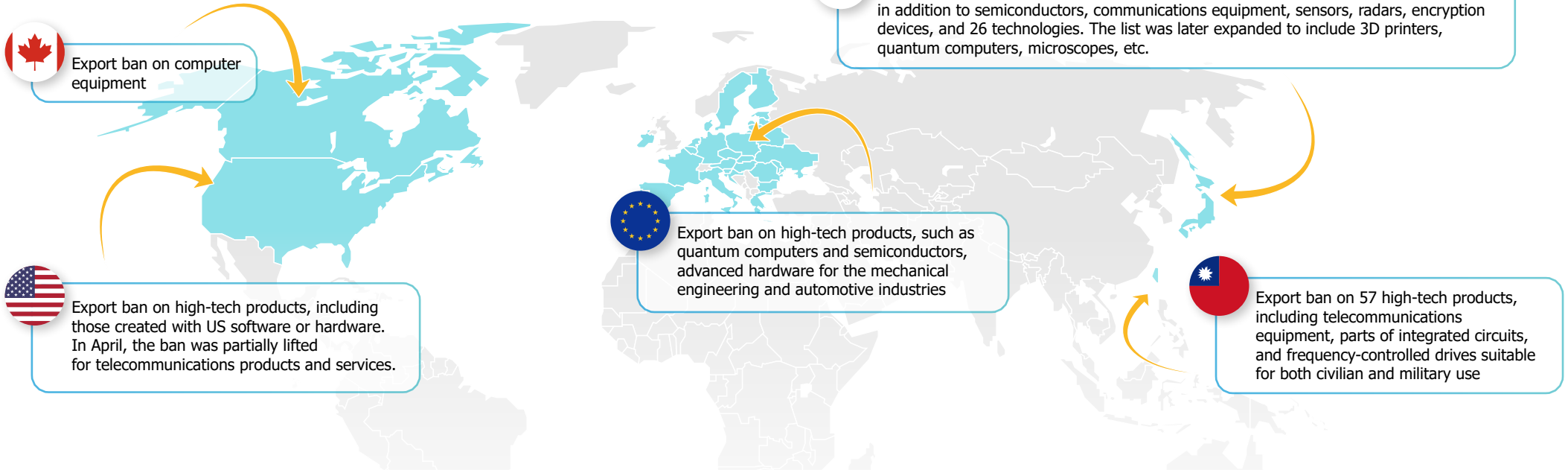
In the medium and long run, these measures will have a disastrous effect on many industries in the aggressor country. Cloud computing centers, high-performance computers, aviation, and energy sector equipment require regular replacement and update of microprocessors, controllers, and sensors. Not only will lack of access to technology slow down the Russian economy, but it will also significantly weaken military capabilities, as the modern security sector also depends on advanced chips, devices, and materials.

It is crucial to completely deprive the Russian Federation of partners for the sanctions policy to work effectively. Achieving this requires communication with market players to convince them to stop supplying high-tech goods to this country or at least avoid increasing their supply. With the shortage of integrated and printed circuits in the market and the demand exceeding the supply, it will not cause losses for these companies to refuse to work with Russia, yet it will contribute to further weakening the aggressor country's economy.











Sanctions policy against the Russian Federation

Country-specific measures



Major manufacturers that have announced the cessation of business with the Russian Federation

<p>United Kingdom >> </p> <p>The world's largest manufacturer of semiconductor components and devices, developer and manufacturer of x86-series microprocessors, processors for IBM-compatible personal computers</p>	<p>USA >> </p> <p>Integrated electronics manufacturer, the world's second-largest supplier of x86 compatible processors, a major supplier of flash memory</p>	<p>USA >> </p> <p>One of the largest American manufacturers of integrated circuits for signal conversion (including digital signal processors and analog-to-digital converters)</p>	<p>Taiwan >> </p> <p>Semiconductor manufacturer that develops components for wireless, optical storage, GPS, HDTV, DVD</p>
<p>Netherlands >> </p> <p>Manufacturer of semiconductor electronic components, one of the top-20 players in the semiconductors production</p>	<p>South Korea >> </p> <p>World leader in the production of semiconductors, telecommunications, and digital media equipment, as well as in digital convergence technologies</p>	<p>Taiwan >> </p> <p>The largest single-profile independent semiconductor company. Manufactures chips using technical process of 90, 65, 45, 40, 28, 20, 16/12, 10, 7 nanometers</p>	<p>Japan >> </p> <p>Manufacturer of high-tech products, the world leader in high-tech ceramics, electronic components, solar panels, cell phones, and office equipment</p>

Sanctions policy against the Russian Federation

The sanctions policy will cover, to varying degrees, all areas where electronics are used. The Russian government claims it will be able to meet its own technological needs, but the lasting trend toward globalization has made it impossible to achieve that goal. Individual countries specialize in various stages of chip production: designing, machinery engineering, software development, etc. Even for the simplest

chip manufacturing, many countries involve their resources. For example, Taiwan has the largest share of about 50% in chip production, while Germany and the United States create the software for these facilities, and photolithographic machinery is produced by the Dutch company ASML, which market share reaches 80%–90%. Therefore, no country in the world can manufacture a chip independently.

The sectors of the Russian Federation deemed most vulnerable to technological sanctions



Military industry

The US defense industry uses 20 nm chips, while the Russian industry uses 65 nm ones. But even such inferior chips are not produced in Russia; instead, they are imported from Taiwan.

In the Russian Federation, Kremniy EI company manufactures microchips for the defense industry, but their products are highly outdated. Only in 2019 the company adopted the 500-nanometer process and is now trying to master the 350-nm method. Even if they introduce the new technology, the chips must go through a complicated and long certification process before the military sector can use them. Several 500-nanometer chips can also be installed to achieve the functionality of a 65-nanometer chip, but that would make manufacturing more expensive and the hardware heavier.



Space industry

Previously, Taiwan was producing microchips for the Russian space industry. Now, this production has ceased, meaning that the characteristics of Russian space equipment have been rolled back for 10-15 years. In addition, even before the sanctions, Russian equipment was inferior to Western equipment in terms of its characteristics.

For example, the GLONASS-K satellite was developed in 2014 and contained many imported microchips. In 2014, after most of these chips fell under sanctions, GLONASS-K2 was developed, which turned out to be twice as heavy and more oversized than GLONASS-K due to domestic chips.



Civil aviation

The Russian Federation is subject to a ban on the supply and leasing of aircraft, helicopters, and other aircraft, as well as their insurance and maintenance. Such sanctions can lead to a significant reduction in the civilian aircraft fleet.

It will not be possible to compensate for the shortage of the aircraft fleet through domestic production because the ban on the supply of microchips jeopardizes the continuation of programs for the production of Russian passenger aircraft SSJ-100 and MS-21.



Automotive industry

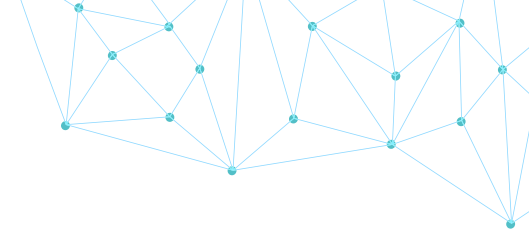
World car manufacturers are leaving the Russian market one after another, and replacing their domestic production will be quite problematic and time-consuming.

Almost all of the necessary car components need modern imported microchips. In their absence, it is possible to produce cars with 15–20 years old operating characteristics.











It is virtually impossible to ensure adequate replacement of sub-sanctioned microchips. For example, Russia does not produce 180 nm control chips. It is possible to replace them, using several components instead of one, but this will also significantly increase the cost. Specifically, a car equipped with the Lada Granta features will cost as much as a Porsche.



Sanctions policy against the Russian Federation



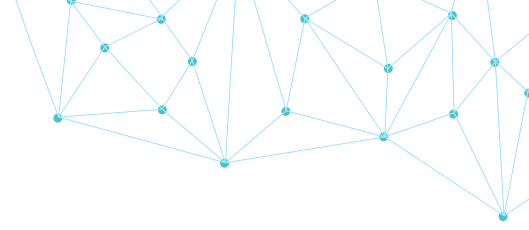
Manufacturers significant for Russian imports with no public statements on the termination of work with the Russian Federation

	 TEXAS INSTRUMENTS	 life.augmented	 MICROCHIP	 ALTERA	 Infineon
 Description	Designer, tester, and manufacturer of analog and digital chips.	Designer and manufacturer of semiconductor electronic and microelectronic components	Manufacturer of microelectronics, microcontrollers, analog and interface products	Developer of programmable logic devices without its own manufacturing facilities. In 2015 it was taken over by Intel.	One of the largest telecommunications microchips manufacturers
 Founded	1930, USA	1987, Switzerland	1987, USA	1983, USA	1999, Germany
 Products supplied to the RF	<ul style="list-style-type: none"> • Integrated circuits: electronic monolithic, analog electronic, analog monolithic, analog-digital electronic, hybrid, with transceiver, and others • Parts for chips • Microcontrollers • Processors and controllers • Storage devices • EEPROM • Amplifiers • Single-chip digital video decoders • Analog-to-digital converters • Converters • Charge driver • Voltage controllers • Reference voltage sources • Pushbutton switches • Active SMD components of the transceiver board 	<ul style="list-style-type: none"> • Integrated circuits: electronic monolithic, analog for operational amplification, analog-digital monolithic, hybrid, and others • Microcontrollers • Processors and controllers • EEPROM • Amplifiers 	<ul style="list-style-type: none"> • Integrated circuits: electronic monolithic, analog electronic, analog for operational amplification, analog monolithic, analog-digital electronic • Parts for chips • Microcontrollers • Processors and controllers • EEPROM • Amplifiers 	<ul style="list-style-type: none"> • Integrated circuits: electronic monolithic, programmable logic • Dynamic operational storage devices • EEPROM 	<ul style="list-style-type: none"> • Integrated circuits: electronic monolithic, analog monolithic, analog electronic, and others • Processors and controllers • Storage devices • Digital modules
 Annual profit	18 billion USD (2021)	13 billion USD (2021)	5 billion USD (2021)	1.9 billion USD (2014)	11 billion EUR (2021)
 Headcount, ths. people	31	8	20	N/A	50














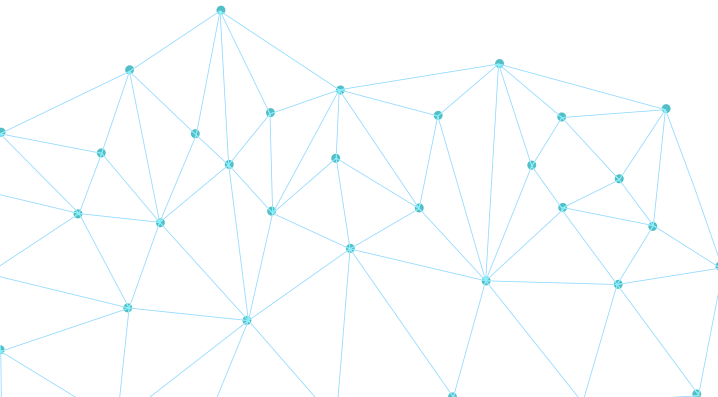


Sanctions policy against the Russian Federation



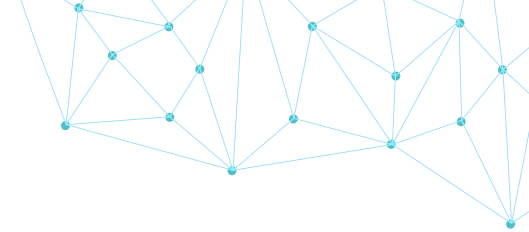
Suppliers significant for Russian imports with no public statements on the termination of work with the Russian Federation

					
 Description	Developer of programmable logic devices. Does not have its own production facilities and cooperates with different integrated circuit manufacturers to produce its products. Taken over by AMD in 2020.	Developer and manufacturer of analog and mixed-mode integrated circuits. Taken over by Analog Devices in 2021.	Leading supplier of printed circuit boards to more than 50 countries	Semiconductor developer and manufacturer, owned by Infineon Technologies since 2020	A company focused on digital security, biometrics, identification and authentication, and data analytics.
 Founded	1984, USA	1983, USA	2007, Singapore	1982, USA	2017, France
 Products supplied to the RF	<ul style="list-style-type: none"> • Integrated circuits: electronic monolithic, programmable logic, and others • Processors and controllers • Storage devices • EEPROM 	<ul style="list-style-type: none"> • Integrated circuits: electronic monolithic, analog monolithic, analog-digital electronic monolithic, power management chips • Processors and controllers • Amplifiers 	<ul style="list-style-type: none"> • Multilayer printed circuits 	<ul style="list-style-type: none"> • Integrated circuits: electronic monolithic, analog monolithic, analog-digital electronic, power management chips • Processors and controllers • Storage devices • EEPROM • Amplifiers 	<ul style="list-style-type: none"> • Integrated circuits: digital monolithic, monolithic based on a chip module
 Number of factories	0	N/A	N/A	5	10
 Annual profit	3 billion USD (2021)	2.6 billion USD (2021)	14 billion USD (2020)	2.5 billion USD (2018)	2.2 billion EUR (2021)
 Headcount, ths. people	5	7	35	N/A	15


















Sanctions policy against the Russian Federation

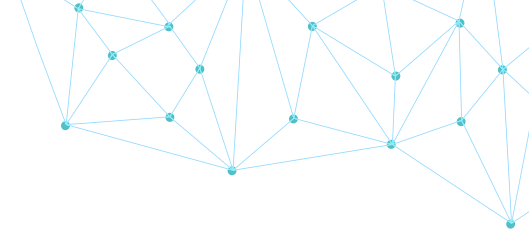


Suppliers significant for Russian imports with no public statements on the termination of work with the Russian Federation

					
 Description	Supplier of tech products worldwide, has its own manufacturing facility	Distributor of electronic components	Wholesaler of electrical appliances and electrical equipment	Distributor of a wide range of products	Wholesaler of IT products and services
 Founded	2015, Hong Kong	2006, China	1997, Netherlands	2011, Cyprus	2018, Cyprus
 Business focus	High-tech computer parts, cloud and terminal servers, cloud software	Semiconductors, LED, electromechanical components, power supplies, and spares for consumer, automotive, and electronic medical systems.	Electrical equipment and parts	Professional and commercial equipment, spare parts, furniture, household appliances, pharmaceuticals, clothing, etc.	IT equipment, software products
 Products supplied to the RF	<ul style="list-style-type: none"> • Microprocessors • Processors for workstations and servers 	<ul style="list-style-type: none"> • Integrated circuits: monolithic, digital monolithic • Microcontrollers • Storage devices • EEPROM • Amplifiers 	<ul style="list-style-type: none"> • Integrated circuits: electronic monolithic • EEPROM • Amplifiers • Single-chip digital video decoders • Converters • Voltage controllers • Active SMD components of the transceiver board 	<ul style="list-style-type: none"> • Multilayer printed circuits • Electronic monolithic integrated circuits • EEPROM 	<ul style="list-style-type: none"> • Digital electronic integrated circuits
 Major partners	Intel, AMD, Samsung, SK Hynix, Kingston Technology, Micron, and others	Texas Instruments, Altera, Xilinx, Analog Devices, and others	STMicroelectronics, Texas Instruments, TE Connectivity, Amphenol, KEMET Corporation, Microchip Technology, Intel, and others	N/A	Intel, AMD, Samsung, Lenovo, LG, Xerox, Xiaomi, and others
 Product portfolio	over 500 thousand SKU	N/A	over 3 thousand SKU	N/A	N/A
 Annual sales	N/A	N/A	57 million USD (2020)	669 million USD (2018)	N/A
 Headcount, people	up to 25	33	100	6	28

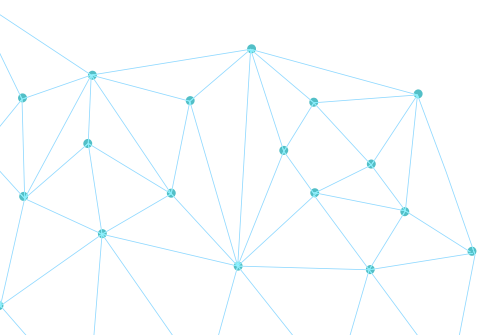


Sanctions policy against the Russian Federation



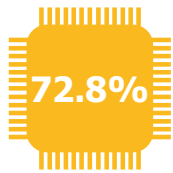
Suppliers significant for Russian imports with no public statements on the termination of work with the Russian Federation

	Komerck	EASYPRO LTD	SEV	Symmetron	PI&EL DEVICES
Description	Leading customs broker in Estonia	International supplier and distributor of IT and networking equipment, computer hardware, peripherals, and other electronic equipment and components	Multifunctional transport company	Electronics wholesaler	Provider of modern solutions from world-leading partners in telecommunications and information technology
Founded	1994, Estonia	2019, United Kingdom	1940, Switzerland	2005, Germany	Hong Kong
Business focus	Warehousing, logistics, and postal services	Computers, computer peripherals, software, electronic and telecommunication equipment, and spare parts	Customs, transportation, logistics, and packaging services. Free port and warehousing services	Household appliances, electrical and electronic goods	Telecommunications technology, software, and hardware
Products supplied to the RF	<ul style="list-style-type: none"> Integrated circuits: digital monolithic, analog for operational amplification, analog-digital monolithic 	<ul style="list-style-type: none"> Digital integrated monolithic circuits 	<ul style="list-style-type: none"> Electronic integrated circuits Parts for chips EEPROM 	<ul style="list-style-type: none"> Electronic monolithic integrated circuits 	<ul style="list-style-type: none"> Microprocessors
Major partners	Elkom Terminal, STL Logistic, Inier Logistics, and others	N/A	N/A	N/A	HP, Lenovo, Juniper Networks, Polycom, and others
Headcount, people	15	N/A	26	5	N/A

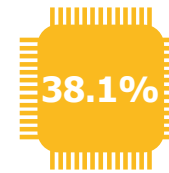




Sanctions policy against the Russian Federation



Share of top-50 manufacturers in imports of integrated and printed circuits (HS 8542 and 8534)



Share of manufacturers who have declared the termination of business activities with the Russian Federation in the import of integrated and printed circuits (HS 8542 and 8534)

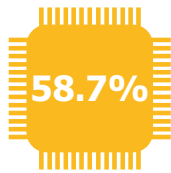
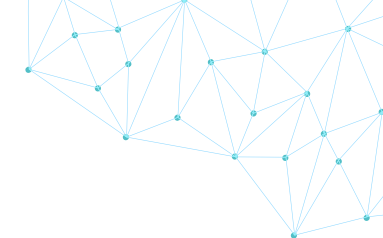
Top-50 manufacturers in Russian imports of integrated and printed circuits (HS 8542 and 8534) in January 2022

Country	Manufacturers	Share in total circuit imports	Statement of termination of business with the RF
United Kingdom	INTEL CORPORATION	19.38%	✓
USA	AMD INTERNATIONAL SALES & SERVICE, LTD.	6.99%	✓
USA	TEXAS INSTRUMENTS INC.	6.15%	
USA	ANALOG DEVICES, INC.	5.71%	✓
Switzerland	STMICROELECTRONICS	4.03%	
USA	MICROCHIP TECHNOLOGY INC.	3.19%	
Taiwan	MEDIATEK	2.12%	✓
USA	ALTERA CORPORATION INC.	1.94%	
Germany	INFINEON TECHNOLOGIES	1.64%	
Netherlands	NXP SEMICONDUCTORS	1.58%	✓
USA	XILINX, INC.	1.43%	
South Korea	SAMSUNG ELECTRONICS CO., LTD.	1.01%	✓
USA	MAXIM INTEGRATED	0.94%	
Taiwan	TSMC	0.92%	✓
China	FINELINE	0.91%	
USA	CYPRESS SEMICONDUCTOR CORPORATION	0.89%	
France	IDEMIA FRANCE SAS	0.88%	
Norway	NORDIC SEMICONDUCTOR CO.	0.87%	
Hong Kong	NEKOM LIMITED	0.82%	
China	XH SMART TECH (CHINA) CO., LTD.	0.81%	
Taiwan	REALTEK SEMICONDUCTOR CORP.	0.80%	
Singapore	AVAGO TECHNOLOGIES INTERNATIONAL	0.71%	
China	NCAP CHINA	0.61%	
Germany	X-FAB SEMICONDUCTOR FOUNDRIES	0.61%	
China	BMTI	0.55%	

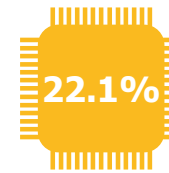
Country	Manufacturers	Share in total circuit imports	Statement of termination of business with the RF
South Korea	KONA I CO., LTD	0.52%	
USA	DDC	0.51%	
Hong Kong	GOLDPAC FINTECH HONG KONG LTD.	0.43%	
Taiwan	NOVATEK MICROELECTRONICS CORP.	0.43%	
Japan	KYOCERA CORPORATION	0.42%	✓
China	GRANDWORK TECHNOLOGY LLC	0.40%	
China	TEAN ELECTRONIC (DA YA BAY) CO., LTD	0.36%	
Hong Kong	ICAPE HK COMPANY LTD.	0.36%	
USA	ON SEMICONDUCTOR	0.32%	
Japan	YAMAHA CORPORATION	0.31%	
China	GIGADEVICE SEMICONDUCTOR INC	0.30%	
Hong Kong	RICHLYTON ELECTRONIC (HK) LIMITED	0.27%	
Malaysia	JATRONICS	0.27%	
China	ONLITEX ELECTRONIC HOLDING LTD.	0.24%	
Germany	GIESECKE+DEVRIENT MOBILE SECURITY GMBH	0.24%	
China	INNO CIRCUITS LIMITED	0.24%	
Thailand	APEX CIRCUIT (THAILAND) CO.,LTD.	0.21%	
China	VENTURE ELECTRONICS TECHNOLOGY LIMITED	0.21%	
China	SHENZHEN SUNTAK MULTILAYER PCB CO.,LTD.	0.20%	
Hong Kong	FUCHANGFA TECHNOLOGY CO., LTD	0.19%	
Taiwan	SHIN PUU TECHNOLOGY CO., LTD	0.19%	
China	KINGBROTHER TECHNOLOGY LTD., HAWKWIN ELECTRONICS TECHNOLOGIES CO.LTD	0.18%	
Taiwan	ITE TECH. INC.	0.18%	
USA	MONOLITHIC POWER SYSTEMS, INC.	0.18%	



Sanctions policy against the Russian Federation



Share of top-50 suppliers in imports of integrated and printed circuits (HS 8542 and 8534)



Share of suppliers who have declared the termination of business activities with the Russian Federation in the import of integrated and printed circuits (HS 8542 and 8534)


Top-50 suppliers in Russian imports of integrated and printed circuits (HS 8542 and 8534) in January 2022

Country	Suppliers	Share in total circuit imports	Statement of termination of business with the RF
United Kingdom	INTEL CORPORATION (UK) LTD	5.83%	✓
Czech Republic	ASBISC ENTERPRISES PLC, AGENCY PRAGUE, ORGANIZACNI SLOZKA	5.22%	✓
Cyprus	ISOLIN TRADE & INVEST LIMITED	3.76%	✓
USA	AVNET LOGISTICS	3.36%	✓
Hong Kong	BRUKIDA LIMITED	3.02%	
South Korea	LG ELECTRONICS INC.	2.94%	✓
China	SINNO ELECTRONICS CO., LIMITED	2.55%	
Netherlands	BV ARROW ELECTRONICS DLC	2.25%	
Cyprus	MERLION TRADE WORLDWIDE LIMITED	2.18%	
Cyprus	MCS IT DISTRIBUTION LIMITED	1.70%	
Estonia	AS KOMERK (TALLINN, ESTONIA)	1.67%	
United Kingdom	EASYPRO LTD	1.50%	
Austria	SEV	1.30%	
Germany	SYMMETRON GMBH	1.07%	
Denmark	DSV AIR & SEA LTD	1.01%	✓
Hong Kong	PIXEL DEVICES LTD C/O ATC AIR SERVICE LIMITED	0.99%	
Hong Kong	GLOBAL ALLIANCE LOGISTICS (HK) LIMITED	0.98%	
China	IDEMIA (SHENZHEN) TECHNOLOGIES COMPANY LIMITED	0.86%	
Hong Kong	NEKOM LIMITED	0.82%	
China	XH SMART TECH (CHINA) CO., LTD.	0.81%	
Cyprus	ENIKS CYPRUS LTD. C/O CARGO-PARTNER LOGISTICS LTD	0.75%	
China	XIAMEN CANDOUR CO., LTD	0.69%	
Hong Kong	XIN QUAN ELECTRONICS (HONGKONG) CO., LIMITED	0.69%	
Hong Kong	TORDAN INDUSTRY LIMITED	0.64%	
Singapore	STMICROELECTRONICS ASIA PAC P/L	0.62%	

Country	Suppliers	Share in total circuit imports	Statement of termination of business with the RF
Estonia	ELMEC TRADE OU	0.60%	
Germany	SMART IMPEX GMBH	0.59%	
Hong Kong	HK KEMEI ELECTRONICS CO., LIMITED	0.54%	
Hong Kong	RICHMOND PCB COMPANY LIMITED	0.52%	
Latvia	OTK GROUP SIA	0.52%	
South Korea	KONA I CO., LTD.	0.52%	
Germany	IPG LASER GMBH	0.51%	
Switzerland	SHVABE-ZURICH GMBH C/O BENICO LIMITED	0.51%	
China	GRANTS PROMOTION SERVICE LIMITED	0.51%	
Hong Kong	WIN KEY LIMITED	0.50%	
USA	ETECH ASIC GROUP LLC C/O NAUTECH CORPORATION	0.50%	
South Korea	SAMSUNG ELECTRONICS CO., LTD	0.49%	
Hong Kong	GOLDPAC FINTECH HONG KONG LTD.	0.43%	
China	VENTURE ELECTRONICS TECHNOLOGY LIMITED	0.43%	
USA	NAUTECH CORPORATION	0.42%	
Taiwan	REALTEK SEMICONDUCTOR CORP.	0.42%	
Slovenia	ISKRATEL, D.O.O., KRANJ	0.41%	
Philippines	MAXIM PHILIPPINE OPERATING CORP	0.41%	
Hong Kong	BENICO LIMITED C/O KOBI INTERNATIONAL COMPANY	0.40%	
China	GRANDWORK TECHNOLOGY LLC	0.39%	
Singapore	SCSC SINGAPORE PTE. LTD	0.38%	
Lithuania	UAB "ELSO GRUPE"	0.37%	
China	BEAUTACE INT'L CO LTD	0.37%	
Hong Kong	GIEC TECHNOLOGY (HONG KONG) CO., LIMITED	0.37%	
Slovakia	WWSEMICON GMBH - ORGANIZACNA ZLOZKA	0.36%	



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