

The Legal Regulation of Integrated Circuit Topography

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Abstract – In this paper authors deal with legal regulation on commercial exploitation of integrated circuit topographies. The legal regulation of the subject matter is important due to wide application of integrated circuits in all areas of technique. Demand increasing raised financial effect. Financial gain and possibility of integrated circuit topographies copying attracted unauthorised use of it. Existing laws on industrial property did not render sufficient protection for creators of integrated circuit topographies. New ones were necessary. Although imperfect and of specific nature they provide decent motivation basis for further research and practical application of innovation in this area of information technology.

Keywords – integrated circuits, topography, industrial property law

1. Introduction

Origination and development of integrated circuits were caused by commencement and development of electronics. Development of electronics started at the end of XIX and at the beginning of XX century. For origination of electronics, as a part of physics where movement of electrons and other electric charge carriers has been researched, discovery of electron (Thompson, 1897) had been of key importance. It enabled explanation of electro-conductivity and construction of electronic i.e. vacuum tubes (1904: John Ambrose Fleming - diode and 1906: Lee de Forest - triode). These tubes are used for production of radio sets and other electronic gadgets that accelerated development of electronics. At the beginning attention was not paid to largeness of electronic components. But during World War II questions of miniaturisation, quantities of electric power necessary to supply devices they could work properly, resistance on mechanical strikes, shakes, quakes etc. Propounded [1]. The best solution is achieved through usage of semiconductors. "Due to appearance of semiconductive elements a qualitative leap in miniaturisation of electronic devices has been committed". Development of semiconductive elements began after transistor has been invented. Invention of transistors is of essential importance for integrated circuits origination because an integrated circuit is

made when two or more transistors (and other electronic components) are aggregated and connected on a singular background so that they produce an electronic effect. At the beginning integrated circuits were made by few transistors and other electronic components fixed on a germanium (Kilby) or silicon (Noyce) plate. Upon the time integrated circuits had being become more complex. Chronologically development of integrated circuits may be followed from integrated circuits of small scale integration (SSI) with more than ten; medium scale integration (MSI) with more than a hundred; large scale integration (LSI) with more than thousand; very large scale of integration (VLSI) with more than twenty thousands and i ultra large scale integration (ULSI¹) with more than million transistors and other electronic components [2].

Since the application of integrated circuits is possible in almost all technical areas (telecommunication, auto, military, astronautic and especially computer industry) research work on integrated circuits improvement became of a high intensity. At the same time, so wide application of integrated circuits caused demand increasing on the market. To meet such demand, production of integrated circuits had to be risen. It happened and integrated circuits production raised so much that value of produced integrated circuits went beyond US\$ billions. Financial gain has been tremendous. From 1978 to 1984 overall profit in the industry increased from five to twenty US\$ billions [2]. This was a reason to put the question of legal protection of creators of integrated circuits into consideration. Whereas integrated circuit is a material expression of intellectual creative work applicable in industrial production, the answer ought to find within Industrial property law. The possibility to grant patent for invention of integrated circuit was not disputable, but the problem was how to protect successful endeavours on improvement of invented integrated circuits. It was made out that patent protection for results achieved with work on integrated circuits improvement is not available because requirements regarding novelty [3] or inventive step could not be fulfilled. To protect it as an industrial design did not deem suitable not only

because appearance of integrated circuit can not be perceived with naked eye but because it "by no means seems as an esthetic creation" [3]. It was obvious that solution must be sought out of existing frames of Industrial Property Law. The first law which separately regulated the subject matter of integrated circuits was adopted in the USA in 1984. Yet next year Japan brought *Act Concerning the Circuit Layout of a Semiconductor Integrated Circuit*. The USA and Japan were followed by European Economic Community whose Council on 16th December 1986 issued *Directive on the legal protection of topographies of semiconductor products*. By virtue of the Directive laws on the subject matter have been adopted in Germany, the Netherlands and France (1987), Spain (1988), the United Kingdom (1989) etc. The subject matter of the legal protection by virtue of mentioned laws were determined: integrated circuit as such and mask work (US), circuit layout (Japan) or topography of elements of circuit (EEC - EU). Topography of integrated circuit is identified as a subject-matter of the (industrial) law protection because intellectual work onto creation of integrated circuit exerts in creation of its internal structure i.e. allocation (lay-out) of electronic elements the circuit is consisted of and their interrelations[3]. National regulation has been very soon (26th May 1989) superstructured by international one when in Washington was signed Treaty on Intellectual Property in Respect on Integrated Circuits. The subject matter of the Treaty is only topography (*layout-design*) of integrated circuit. This because creative work on improvement of integrated circuit is not only contented but also exhausted in creation of integrated circuit topography, yet integrated circuits as such are products - goods intended for selling onto market and can not be protected by Intellectual Property Law other way than indirectly by Industrial Property Law protection of topography which served for integrated circuit fabrication. It is important to emphasize that legal protection of integrated circuit topography is not limited to topographies of semiconductive integrated circuits. It has been taken care that technical development may cause that integrated circuits would not be build upon the technology based on semiconductors any more. Now we can see that by favour of development of nanotechnology there are real possibilities of production of nanochips based on carbide (C). The change of silicium chips by those produced of nanomaterials would enable production of ultrafast computers that would represent bigger technological advancement than that caused by invention of chips which replaced vacuum tubes [3]. On international level, the legal protection of integrated circuit topographies is regulated by 1995 WTO Agreement on Trade - Related Aspects of Intellectual Property Rights

(TRIPS) as well. It is very important since Washington Treaty has not come into effect yet.

2. Subject-Matter of Integrated Circuit Topography Right

Integrated circuit topography right is an absolute subjective industrial property right by virtue of which holder of the right is authorised on exclusive commercial use and disposition of integrated circuit topography. At that it is very important to make distinction between subject matter of legal protection and to what or who the subject-matter belong [4].

The subject-matter of integrated circuit topography right is topography of integrated circuit. Topography is a word of ancient Greek origin compound from words *topos* - place, territory and *graphein* - to write and means description of either surface and configuration of parts existing on some space, realm [2]. Integrated circuit topography is on any way presented threedimensional layout of electronic elements, out of which at least one is active, and their interrelations or such threedimensional layout prepared for integrated circuit production. Integrated circuit is a final product or semiproduct within which an electronic function works out and within which are elements (out of which at least one is active) and their interfaces integrally formed on a piece of a material or both on and in a piece of a material. Active electronic elements are transistors, thyristors, diodes and so on and passive elements are elements such as resistors or capacitors. In the field of electronics integrated circuit is well known as a chip. The subject-matter of integrated circuit topography right is not integrated circuit (i.e. chip) as a product (or semiproduct) nor technology used in production of topographies or integrated circuits, information positioned within an integrated circuit, ideas, procedures, processes, systems, methods, conceptions, principles or discoveries nevertheless on the mode they described or explained. The subject-matter of the legal protection is only integrated circuit topography that is display threedimensional layout electronic elements and relations between them as a nonmaterial creation which can be conveyed onto chip as a product.

3. Conditions for Grant Integrated Circuit Topography Right

In order to obtain the legal protection for integrated circuit topography three conditions must be fulfilled simultaneously. First, integrated circuit topography must be result of an intellectual effort. Integrated circuit topography is a result of an intellectual effort of a creator when creative work achieves inventive level

sufficient to consider integrated circuit topography as a novel. Extent of novelty of topography is specified by the second condition towards which the legal protection over integrated circuit topography can be reached only if in moment of commencement it was not notorious among creators of topographies or producers of integrated circuits. ..."As notorious are deemed only those topographies of integrated circuits which represent fullscale copy of existing topographies in semiconductor industry [5]. In respect of that it is possible to acquire the legal protection for such integrated circuit topography consisting of combination of electronic elements and their interfaces which are notorious if integrated circuit topography, observed as a whole, does not represent copy of any existing topography. Seeing that topographies of integrated circuits are made by upgrading of existing ones it is possible to obtain the legal protection for results achieved by so called reversible engineering. The third condition reffers to the term within which is possible to apply for legal protection. Length of terms is laid down differently and depend on the fact if integrated circuit topograpy has been commercially used or no. If integrated circuit topography has been commercially used, the term to claim for legal protection is two years since day of the first commercial use of integrated circuit topography anywhere in the world. If integrated circuit topography has not been commercially used the application for legal protection can be submitted within the term of fifteen years from the day it was created. Commercial use of topography is any production or distribution integrated circuit topography or integrated circuit produced by the topography, either alone or as a part of the other product, in order to make a profit, but not for private purposes.

4. Subjects, Contents and Endurance of Integrated Circuit Topography Right

The original subject directed for grant of integrated circuit topography right is creator of integrated circuit topography. It is a physical person who created integrated circuit topography by its intellectual work or its succussor in title. Since integrated circuit topographies are usually made by electrical engineers employed in companies, authorisation to claim for legal protection belongs to employers according to rules on legal protection of inventions invented in labour relations. Foreign persons are allowed to obtain the legal protection, if there is reciprocity, the same as domestic persons. In a case of doubt, existence of reciprocity must be proved by that who invokes on that. If integrated circuit topography created by more persons they enjoy common legal protection [6].

Holder of the integrated circuit topography right is exclusively authorised to:

1) Multiply topography in full or its intrinsic parts. This authorisation is a typical copyright law authorisation and reffers to act of multiplication of the topography on paper, computer, film or so. In that sense, holder of the right is authorised to prohibit to unathorised persons to reproduce protected topography through production of integrated circuits built upon the topography. The legal protection contains prohibition of anauthorised copying of intrinsic parts of topography as well. Intrinsic parts of topography are those parts of topography in which its main characteristics are consisted.

2) Produce integrated circuits based on protected topography or its intrinsic parts. This is the most important authorisation which refers to regular way of commercial usage of protected topography.

3) Export, import, offer on account of put it onto market, put it onto market or commercially use of topography or its intrinsic parts or integrated circuits built upon the topography on other ways. This authorisation is common for all Industrial Property rights.

Holder of the right on integrated circuit topography is authorised onto other ways of commercial usage of topographies including incorporation of integrated circuit built upon protected topography into vary electronic devices and other products such as computers, cars, mobile phones etc. to put these onto market or commercial use on another way.

Holder of the right on integrated circuit topography are authorised to dispose its right. Right on integrated circuit topography can be altogether or partially transferred legally by virtue of contract or inheritance [7]. Some or all powers regarding commercial use of legally protected topography can be assigned by licence agreement. Contracts which object is disposition with rights on integrated circuit topography are valid only if they are made in written. Legal effects toward third persons are achieved only if contracts are registered in the proper register managed by Intellectual Property Office. Registration is on volunteer basis and it will be done upon the request of a contractual party.

Right to integrated circuit topography is limited by authorisation of a third person to:

- multiply legally protected integrated circuit topography for personal use in noncommercial purposes;

- multiply legally protected topography for tuition as well as professional analysis or enquiries;

- make and commercially use new topography based on analysis and exploring of legally protected one.

Right on integrated circuit topography lasts from the day when application has been filed or from the first day of commercial usage of topography dependant on the fact which date is earlier. Legal protection of integrated circuit topography is temporary. It expires at the end of calendar year in which passed ten years from the day when the term of legal protection of integrated circuit topography begin. Right on integrated circuit topography may be terminated before prescribed term expiration in case of [8]:

1) non-payment of tax for maintenance of the right into force;

2) waiving of the right;

3) decease of physical person i. e. smrti fizičkog lica, odn. completion of legal person, unless the right has not been inherited by successor in title;

4) cassation of decision on grant of the right.

The decision on grant the right shall be made invalid if is established that in the moment of decision making: subject-matter was not integrated circuit topography, conditions to grant right were not fulfilled, application of topography was not filed in proper term, holder of the right was not authorised to claim for protection or was not represented by legal represent but had to be, documents enclosed to the application were not suitable or were not matched to the integrated circuit that is the object of protected topography. Cassation of the decision can be requested till expiration of legal protection. Proposal for cassation have to be filed in two copies and must content explanation and assignment to appropriate proofs. Cassation can be requested by interested party or Intellectual Property Office. Cassation of the decision does not have retroactive effect to irrevocable judgements on right infringement or agreements including licences if and in extent in which they are enforced, under condition that plaintiff was in good faith.

5. Conclusion

Creators and purchasers of integrated circuit topographies are legally protected within the field of Industrial Property Law. It is possible because topography of integrated circuit is an intellectual creation i.e. product of intellectual effort of its creator that can be numberless time used to produce integrated circuits. Further it is a creation whose value can be financially expressed (otherwise it could not be bought

or sold on a market) and it is applicable in industrial production for producing of technical appliances. And at the end it is explicitly envisaged by TRIPS as an intellectual creation eligible for legal protection within Industrial Property Law. Since existing or better traditional Industrial Property Law legislation is not suitable for regulation of legal protection of integrated circuit topographies since eighties of XX century new one commenced. This way return of invested work, money, time and other inputs in creation of topographies and gain of a proper profit are enabled. This legislature represents decent legal incentive to development of the electronics based on integrated circuits.

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