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# "Need for Protection of Topography of Semiconductors Integrated Circuits in India"

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## ABSTRACT

Integrated circuits are critical components in a wide range of electrical products in modern technology, including common items like watches, television sets, washing machines, and cars, as well as sophisticated computers, smart phones, and other digital gadgets. The development of innovative integrated circuit layout designs is critical for the creation of ever-smaller digital devices with greater functions. Although the creation of a new layout-design normally necessitates a significant financial expenditure as well as a significant amount of time from highly qualified experts, replicating such a layout-design may simply cost a fraction of the original investment.

As a result, protection of topography (layout designs) of semiconductors is one of the most core concern areas in modern and fast changing technology world. This paper reviews the existing law which are there in relation to the protection of topography of semiconductors ICs from IPR[1] to SICLDA[2]. While India has undoubtedly met some standards in this regard by creating a sui generis system for protecting IC topographies, it has yet to deal with a fundamental and unsolved problem i.e., some lacunas prevailing in the sui generis system. This paper investigates the cause of the problem and finds possible solutions within the scope of existing laws.

***Keywords*****:** Topography, Integrated Circuits, Protection, Layout-Designs, Semiconductors, Chip.

## LITERATURE REVIEW

The source of data is secondary and mostly taken help from library, statutes, journals and internet.

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- Intellectual Property Protection of Integrated Circuits: International Developments and the case of Hong Kong by K. H. Pun
- Trends in Intellectual Property Right by Pawan Deep Sign, Deepika Garg and Prof. R.O. Vaishya
- Semiconductors: Critical Analysis of Indian Legal Regime by Prachi Behl

[1] Intellectual Property Rights
[2] Semi-conductor Integrated Circuit Layout Design, 2000.

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- The Law on Semiconductor Integrated Circuit Layout Design in India by Sanjana Pramod
- The Semiconductor Integrated Circuit Layout Design Act 2000 in India and the mischief of freedom of infringement by Saurabh Bindal
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## RESEARCH OBJECTIVE/ RESEARCH METHODOLOGY

The way of research is *secondary research* and the type of research is *qualitative research.* This paper is based on *doctrinal research* i.e., secondary research and *non-doctrinal or empirical legal research.* As doctrinal research is conducted on the basis of data collected by source, i.e., collected by books, web and other indirect resources and non- doctrinal research involves the use of research perspective, research design etc. This project adopts the concept of both research methodology. The doctrinal and non-doctrinal research methodology would be used in analysing the Need for Protection of topography of Semiconductors Integrated Circuits.

The method of research shall be analytical which is based on relevant fact, information, statutes which shall be thoroughly scrutinized by the author to enable the person form opinions and make a critical evaluation of the subject matter.

## STATEMENT OF PROBLEM

Integrated circuits are used virtually all electronic equipment today and have revolutionized the world of electronics. It became possible due to low cost, small size and less weight of integrated circuits. These ICs improved the functional performance of every gadget, in which they were being attached. Hence, when these IC became so much important the need for protecting them aroused. The main problem here is also common to all IPs is the problem of privacy, as it is clear that the structure or process of integrated circuits are not protected but the layout design is protected. Due to this, the piracy of the manufacturing process of IC has increased.

## RESEARCH QUESTIONS

- What is topography of semiconductors of integrated circuits?
- Why there is need to protect topography of semiconductors of integrated circuits?
- What are the lacunas in the existing laws and why it cannot be protected under these laws?
- What are the possible solutions in light of the need of the protection of topography of semiconductor integrated circuits (ICs)?

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## INTRODUCTION

With the rapid advancement in technology from last 2 decades, protection of topography of semiconductors of integrated circuits (ICs) is much needed in present scenario among all the fields within the information technology law and semiconductor law. undoubtedly, ICs lie at the heart of semiconductor chips, and with the advance and development in Very Large-Scale Integration (VLSI) technology[3] have come to be used not only in computers but also in commodities ranging from aircrafts, car, home appliances and mobile telephones to watches any toys. Accordingly, it is no embellishment to say that ICs are currently present in basically every electronic item. Consequently, their significance to a country's industrial development and economic growth cannot be exaggerated.

## BACKGROUND

An integrated circuit[4] (IC)[5] is a miniature of an electronic circuit made up of transistors, diodes, resistors, conductors, and electrical paths that connect all of these components on a flat surface usually to a silicon (semiconductor).[6] With a complex series of manufacturing steps and processes, the layers of ICs are clubbed together in the form of "sandwich" to form a three-dimensional configuration of integrated circuits which determines the electronic functions of chip. Usually, these microchips are embedded in chips. Therefore, an important step begore manufacturing a semiconductor chip is to create an accurate layout design (topography) for each layer and combine to form the required integrated circuit.[7] **Topography**[8] refers to an IC chip layout design that describes the outline structure and placement off conductive materials to perform specific electronic functions.

## ANALYSIS

The topography of an integrated circuit is the result of a huge investment in terms of both finance and research. Continuous improvement is needed, such as reducing the size of integrated circuits.[9] The topography of semiconductor products can also be used in a wide range of products and has great commercial value.[10] A copy of the design can easily be

[3] The Semiconductor Revolution, Integrated Circuits, <electronics - The semiconductor revolution | Britannica> accessed 27 December 2021

[4] Study On Integrated Circuit, accessed 19 November 2021 <Study_on_Integrated_circuit.pdf (idc-online.com)> accessed 27 December 2021

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[6] World Intellectual Property Organization, *Patent Expert Issues: Layout Designs (Topographies) of Integrated Circuits*, < Patent Expert Issues: Layout Designs (Topographies) of Integrated Circuits (wipo.int) > accessed 27 December 2021

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captured in an integrated circuit layer known as *'chip piracy'.*[11] The legal protection of Integrated Circuit topographies has always been a concern of the semiconductor industry and of domestic legislatures. As there is little doubt that IC topographies are intellectual property and must to be protected but what form of protection is most appropriate and core concern of the question. The question can be broken and simplified in the following manner. For instance,

a) Should they be protected as copyright works should they be protected as copyright works in form of drawings?
b) Should they be considered as industrial property and protected under the law of patents or any other industrial property law for utilitarian objects in form of designs?

Answer to these is that existing legislations have their limitations to protect the topography of the integrated circuits. As "industrial works" cannot be copyrighted and only artistic works are copyrighted. Moreover, the term of protection of copyright is very long and the economic life of the IC is only a few years, so the industry would not benefit from such long-term protection. In case of patents, the topography does not suffice for Novelty and non-obviousness criteria. It is difficult to maintain the level of secrecy once the chip is in the market while dealing under trade secrets.[12] When it comes to protection under design law, it protects only the external features of the product but topography deals with the internal design of the components that form the product as a whole.[13]

From the above analysis, it can be concluded that the topography of the integrated circuit chip cannot be protected under patent, copyrights, trade secrets or designs.[14] And if none of the preceding schemes is completely satisfactory, should they be protected under a sui generis law specially devised for them?

India has adopted a separate legislation to protect the Integrated Circuits under the Semiconductor Integrated Circuit Layout Design Act (SICLDA) in 2000.[15] Under section 3(o)[16] of the Patent Act, 1970, the topography of integrated circuits is non-patentable. So, a *sui generis* form of law has been put in place to protect the layout designs of the IC chip.

[11] Carl A Kukkonen, III, 'The Need to Abolish Registration for Integrated Circuit Topographies under TRIPS' (1997) 38 IDEA 106
[12] Pawan Deep Sign, Deepika Garg and Prof. R.O. Vaishya, 'Trends in Intellectual Property Right' (2016) IJAR, 488-494
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[14] Semiconductor Integrated Circuits Layout-Design < Business Laws: SEMICONDUCTOR INTEGRATED CIRCUITS LAYOUT-DESIGN (businesslawfaculty.blogspot.com) > accessed 27 December 2021
[15] Mr. Arjun Banerjee, Ms. Jaya Bhatnagar, Semiconductor Integrated Circuits Layout Design Act, 2000 and its Implications < Semiconductor Integrated Circuits Layout Design Act 2000 | SiebenIP > accessed 27 December 2021
[16] Patent Act, 1970, s 3(o)

SICLDA[17] provides protection to the registered designs only and the registration requirements for the layout design[18] are explained under Section 7[19] of SICLDA, 2000, i.e.,[20]

- ❖ Originality[21]
- ❖ Not been commercially exploited anywhere in India or in a convention country[22]
- ❖ Inherent distinctive[23]
- ❖ Inherently capable of being distinguishable from any other registered layout design[24]

There are certain exceptional actions which do not infringe the registered layout design under this act[25], i.e.,

- ✔ Layout design used for educational activities and research[26]
- ✔ Innocent infringement[27]
- ✔ Reverse Engineering[28]

## CONCLUSION & SUGGESTIONS

Even though the law was enacted in 2000 and the registration authority was appointed in 2004 but the substantive provisions were brought in force only in May 2011. From 2011 there are only two registered layered design.[29] The key reason for lesser number of filings is the lack of knowledge, information zeal surrounding this law among the researcher and industries and it is known that India is still emerging as an important player in the semiconductor industry. With the amendment to the National Electronics Policy[30], there is hope in improvement in filing for the semiconductor industry. Other factors for a smaller number of filings are that this act does not provide protection for **processes or mode of operation** *for*

[17] Saurabh Bindal, 'The Semiconductor Integrated Circuit Layout Design Act 2000 in India and the mischief of freedom of infringement' (2015) Vol 10 Issue 5, JIPLP 378-383
[18] SICLDA, 2000, s 2(h)
[19] SICLDA, 2000, s 7
[20] Atul Gupta, 'Integrated Circuits and Intellectual Property Rights in India' (2005) 10 JIPR, 474-479
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[24] Shefali Jha, 'Overview of Semiconductor Integrated Circuit Layout Design Act, 2000' <Overview of Semiconductor Integrated Circuit Layout Design Act, 2000 | Bail Me Out> accessed 27 December 2021
[25] Semi-conductor Integrated Circuit Layout Design, 2000.
[26] Prachi Behl, 'Semiconductors: Critical Analysis of Indian Legal Regime' (2021) Vol 4 Issue 2, IJLMH, 2530-2557
[27] See *supra* 26
[28] See *supra* 26
[29] Semiconductor Integrated Circuit Layout Design, <SICLDR:Semiconductor Integrated Circuits Layout Design Registry> accessed 27 December 2021
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*which Integrated Circuits is design to perform certain task related to the semiconductor integrated circuits*[31].

Another reason is that this act, as the name suggests (SICLDA)[32], only protects integrated circuits with semiconductor material as the base substrate. If this act can adapt to the regulation under TRIPS agreement[33] where the subject matter of protection is sufficiently broad to protect integrated circuits made from materials other than semiconductors like ceramics, superconductors, insulators or any other material as a substrate, there is a scope of increase in number of registered Layout designs.

Therefore, considering the future scenario of the integrated circuit industry, the application of more extensive product protection measures under this legislation of protection of Integrated Circuits is an urgent issue. So, with amendments to existing laws, it can act as a bridge and can encourage to all market participants to protect their mask work[34], thus, reducing the gap between the act and increasing the number of applications for protection of topography of semiconductors integrated circuits. Another step that could be considered would be to request automatic protection of layout designs instead of requiring registration under another semiconductor protection law that would have eliminated the major problem of chip piracy.

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[31] SICLDA, 2000, s 2 (r)
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[34] "A chip typically has eight to twelve layers, each layer having a unique mask creating the required circuits. These layers of masks, collectively called 'mask work' or 'layout-design', manifest the three-dimensional layout of the chip" < EADBC6CD-281A-4624-880F-8AB66E262126.pdf (manupatra.in) > accessed 27 December 2021

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