

CHIP AWAY: REIMAGINING INDIA'S SEMICONDUCTOR LANDSCAPE - A FRESH LOOK AT THE INTEGRATED CIRCUITS LAYOUT DESIGN ACT

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ABSTRACT

Integrated circuits are fundamental components of nearly all electrical goods in contemporary technology. Circuit chips are present in commonplace goods like watches, televisions, washing machines, and automobiles, as well as in advanced computers, smartphones, and various digital devices. The creation of innovative integrated circuit layout designs is crucial for developing smaller digital devices with enhanced functionalities. While a fresh layout design may necessitate substantial financial commitment and considerable effort from leading professionals, replicating such a design through facsimile would incur only a minor portion of the initial expense. Consequently, the safeguarding of semiconductor topography (layout designs) has emerged as a paramount and critical concern in today's rapidly evolving technological landscape.

This study examines the current legislation on the protection of semiconductor topographies, from intellectual property rights to the Semiconductor Integrated Circuit Layout Design Act. India has indeed met certain criteria by instituting a sui generis system for the preservation of integrated circuit topographies; nevertheless, it has yet to resolve a fundamental and challenging issue concerning the existing lacunae within this system. This study examines the causes of the issue and investigates methods for addressing it within the confines of current legislation.

Keyword: *SICLD Act 2000 (Semiconductor Integrated Circuits Layout-Design Act), Sui generis protection, Topography protection, Integrated circuits*

1. INTRODUCTION

The preservation of semiconductor topography in integrated circuits (ICs) is a significant contemporary topic in both information technology law and semiconductor law, particularly due to the technical advancements over the past two decades.¹ Integrated circuits (ICs) are fundamental components of semiconductor chips, facilitated by the utilization and advancement of Very Large-Scale Integration (VLSI) technology. They are no longer confined to computers but have become integral components of nearly all devices, including aircraft, automobiles, household appliances, mobile phones, watches, and toys. Consequently, it is difficult to contest the assertion that the market is saturated with electrical devices including

integrated circuits. Their influence on a nation's industrial development and economic progress is so significant that it cannot be overstated.²

An integrated circuit (IC) is a miniature electronic circuit that consists of transistors, diodes, resistors, conductors, and the electrical pathways interconnecting these components on a single planar surface, often made of silicon (semiconductor). The layers of integrated circuits (ICs) are amalgamated using the "sandwich" technique through a series of intricate manufacturing procedures, resulting in a three-dimensional arrangement that dictates the chip's electronic functionalities. Typically, these microchips are contained within chips. Consequently, a critical phase in semiconductor chip fabrication involves developing an accurate

¹ Peter S Menell and Suzanne Scotchmer, 'Intellectual Property Law and the Semiconductor Industry' (2007) 24 *Berkeley Technology Law Journal* 725.

² World Semiconductor Industry Association, *Semiconductor Industry and Global Economic Growth Report* (2020).

layout plan (topography) for each layer and subsequently integrating them to form the intended integrated circuit. Topography refers to the layout design of an integrated circuit (IC) chip, encompassing a detailed description of the structural contour and the arrangement of conductive elements to fulfill designated electrical functions.³

The Semiconductor Integrated Circuits Layout-Design Act 2000 (SICLD Act) of India, established to fulfill TRIPS commitments, offers sui generis protection for layout designs; nonetheless, it encounters operational deficiencies and substantive shortcomings that compromise effective topographical protections.

1.1. Michael Fuerch (2009)

Fuerch highlights that international intellectual property frameworks, such as the Washington Treaty and TRIPS, offer insufficient safeguards against layout replication. He further elucidates that in the absence of robust enforcement, competitors can replicate the design at a minimal expense after the original proprietor has invested significantly in research and development, as chip reverse-engineering allows them to circumvent the development expenditures. He asserts that the principal producers, particularly the US and Japan, are the least compliant with TRIPS' 10-year term; in fact, they do not broaden the scope to include new elements such as abstract models, so constraining innovation incentives.⁴

1.2. Sanjana Pramod (2013)

Pramod examines the framework of the SICLD Act 2000, emphasizing that its primary objective is the registration of original layout designs that stem from intellectual endeavor and are not widely known. Consequently, the Act grants the proprietor exclusive rights against reproduction or commercial utilization, irrespective of product incorporation. She underscores that the Act encompasses the register and registrar authority, yet indicates their underutilization, since key elements were just enacted in 2011, hence

³ *ibid.*

⁴ Michael Fuerch, 'International Protection of Semiconductor Layout Designs and the Limits of TRIPS Compliance' (2009)

⁵ Sanjana Pramod, 'The Semiconductor Integrated Circuits Layout-Design Act 2000: Registration and Protection of Chip Topographies in India' (2013)

constraining the development of India's semiconductor intellectual property ecosystem.⁵

1.3. Saurabh Bindal (2015)

Bindal indicates that a significant duplication error occurred in the writing of the SICLD Act. The error resided in the "freedom from infringement" provision, which was inappropriately extracted from the Patent, Copyright, and Trademark Acts without thorough examination of the clauses. Consequently, the "freedom from infringement" provision became the quotation marks utilized for reverse-engineering exceptions, rendering it vulnerable to misuse and potentially unconstitutional. The expedited compliance with TRIPS has obscured the Act's ambiguity until its enforcement in 2011, resulting in diminished protection for topography and increased vulnerability of designs to exploitation.⁶

1.4. Arjun Banerjee and Jaya Bhatnagar

Banerjee and Bhatnagar perform a comprehensive analysis of the ramifications of the SICLD Act 2000, with particular emphasis on the significance of registration, which can yield remedies for infringement encompassing both civil and criminal penalties. They specify imprisonment of up to three years or monetary penalties. These efforts aim to foster commercial development in the nascent semiconductor industry in India. The obstacles posed by the government's use of authorizations under Section 18(4) have been contested in Public Interest Litigations (PILs) as unconstitutional, highlighting the difficulties in enforcing the rights of topographical owners.⁷

1.5. Department of Deeds Companies & Intellectual Property

This likely refers to India's Department for Promotion of Industry and Internal Trade (DPIIT), which has overseen SICLD Registry activities since the enactment of the 2004 regulations. These regulations delineate the processes for submission, evaluation, and contestation of layout

⁶ Saurabh Bindal, 'Drafting Errors and Reverse Engineering Exceptions in the Semiconductor Integrated Circuits Layout-Design Act' (2015)

⁷ Arjun Banerjee and Jaya Bhatnagar, 'Legal Protection of Semiconductor Layout Designs in India: Registration, Enforcement and Constitutional Challenges'

protection to comply with TRIPS standards on originality and length.

1.6. WTO TRIPS Agreement Overview

TRIPS Articles 35-38 mandate that WTO member nations provide protection for original layout designs of integrated circuits (a three-dimensional arrangement of circuit elements) against reproduction or distribution for a duration of ten years, thereby aligning the provisions of the Washington Treaty while permitting reverse engineering for research purposes. The SICLD Act of India appears to comply on paper; nonetheless, it has been noted that it insufficiently addresses local difficulties, including the necessity for enhanced enforcement of topographical innovation, which is integral to the transformations in global supply chains.⁸

The research methodology employed is secondary research, and the study type is qualitative research. This article is based on secondary doctrinal research and non-doctrinal or empirical legal research. Doctrinal research relies on data gathered from sources such as books, websites, and other indirect resources, whereas non-doctrinal research employs research perspectives and designs. This study encompasses both notions of research technique.

The research will be analytical, focusing on pertinent aspects, information, and legislation that the author will thoroughly investigate, enabling the reader to develop a critical judgment and opinion on the subject topic.

Integrated circuits are utilized in nearly all electronic devices nowadays and have fundamentally transformed the field of electronics. The primary factors are the affordability, compactness, and lightweight nature of the integrated circuits, which have led to remarkable capabilities. Each instance of integrating the ICs with a device enhanced its operational efficacy. Consequently, when these integrated circuits grew indispensable, the demand for their safeguarding correspondingly intensified. The prevalent concern affecting all intellectual properties is privacy, as the structure or method of integrated circuits remains unprotected, but the layout design is safeguarded.

This explains the rise in the piracy of the integrated circuit manufacturing process.

The research questions according to the Hypotheses of the research paper are:

- What constitutes the topography of semiconductor integrated circuits?
- Why protect semiconductor IC topography?
- What lacunas exist in current laws preventing effective topography protection?
- What solutions address the need for semiconductor IC topography protection?

2. ANALYSIS

The configuration of an integrated circuit is significantly influenced by a company's financial and research investments. The manufacturing process of integrated circuits must continue to develop to reduce circuit size. The topography of semiconductor goods significantly influences their broad application and contributes to their substantial commercial value.⁹ The design is susceptible to replication if the integrated circuit layer is obtained, a phenomenon referred to as 'chip piracy.' The legal safeguarding of integrated circuit topographies has consistently been a concern for semiconductor industries and their national legislators. While it is indisputable that IC topographies constitute a form of intellectual property requiring protection, the primary debate centers on the most appropriate type of protection to be implemented. The inquiry can be deconstructed and elucidated as follows. For instance,

1. Should IC topography qualify for copyright as drawings or artistic works?
2. Should IC topography receive patent or industrial design protection as utilitarian objects?

The primary response to these inquiries is that existing legislation has limitations in safeguarding the topography of integrated circuits. For instance, "industrial works" are ineligible for copyright, but only creative works are protected by copyright.¹⁰ The lifetime of copyright protection is excessively

⁸ TRIPS: A More Detailed Overview of the TRIPS Agreement (WTO, 2020)

⁹ Michael Fuerch, 'International Protection of

Semiconductor Chip Layout Designs' (2009) *Journal of Intellectual Property Law*.

¹⁰ Copyright Act, 1957 s 2(c)

lengthy, yet the economic viability of intellectual creations is limited to a few years; thus, the industry does not receive adequate long-term protection from such a timeframe. The topography fails to meet the standards of novelty and non-obviousness for patents. Once the chip enters the market, maintaining confidentiality regarding a trade secret becomes exceedingly challenging.

Design law protection is confined to the exterior attributes of a product, whereas topography pertains to the internal components that collectively constitute the object as a whole. The preceding study concludes that the topography of the integrated circuit chip is not eligible for protection under patents, copyrights, trade secrets, or design rights. If none of the aforementioned solutions are entirely suitable, should they be safeguarded by a sui generis law specifically designed for them?

India brought in a dedicated law to protect Integrated Circuits through the Semiconductor Integrated Circuit Layout Design Act (SICLDA) in 2000. Section 3(o)¹¹ of the Patent Act 1970 excludes the topography of integrated circuits from patentability. Thus, a sui generis legal regime has been established to safeguard the layout designs of IC chips.¹² The SICLDA 2000 provides protection exclusively for registered designs, with the registration conditions for layout designs delineated in Section 7 of SICLDA 2000, which stipulates originality and non-commercial exploitation in India or a convention country. Inherently distinctive and capable of being differentiated from any other registered layout design. There exist specific allowed applications that do not amount to violation of the registered layout design under this legislation, namely, Employing the layout design for pedagogical and research objectives Innocent infringement by reverse engineering.¹³

3. CONCLUSION

A substantial delay occurred between the passage of the law in 2000 and the implementation of most of its provisions by May 2011. Since 2011, there have been only two registered layered designs. The limited number of filings can mostly be attributed to the ignorance and lack of information and enthusiasm among researchers

and industries on this legislation, as well as India's status as an emerging market in the semiconductor sector. The revision of the National Electronics Policy suggests a potential rise in submissions within the semiconductor industry. Additionally, the limited number of filings is attributable to the fact that this legislation does not provide protection for processes or operational methods that an integrated circuit is intended to execute concerning semiconductor integrated circuits.

Another factor is that this act, known as SICLDA, exclusively provides protection to integrated circuits that utilize semiconductor material as the foundational substrate. If this act can be aligned with the TRIPS agreement, the scope of protection should be sufficiently expansive to encompass integrated circuits fabricated from materials outside semiconductors, such as ceramics, superconductors, insulators, or any alternative substrate material. The number of registered layout designs may increase. Therefore, considering the future of the integrated circuit business. The implementation of more rigorous product protection procedures under this integrated circuits protection law must be regarded as a matter of urgency. Consequently, modifications to current legislation can facilitate a connection and incentivize all market participants to safeguard their mask works, so bridging the gap between the act and augmenting the volume of applications for the protection of semiconductor integrated circuit topographies. Alternatively, one may contemplate the automatic safeguarding of layout designs without necessitating registration under a distinct semiconductor protection statute, which would address the primary issue of chip piracy.

¹¹ Patents Act, 1970 s 3(o).

¹² Designs Act, 2000

¹³ *ibid* ss 17–18.