SIP drives a new business model of semiconductor

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Overview

In this presentation, I will discuss why Japan IDM can't get a profit and how to get a profit from semiconductor business.

A point of view of business, SOC will be standardized on the plat-form and will be a monopolistic business That means for SOC to be commodity and less-unique products.

On the other hands, SIP has excellent merits for the business, time to market, uniqueness, low cost, etc.

It is very important for us to create the standard SIP plat-form which will be de-fact.

Only the first creator of this, can get a profit from SIP.

1. Introduction

Over the years, various technological developments, including high integration enabled by finepatterning technologies, EDA tools, shorter development/design times enabled by the utilization of IP, lamination packaging, and high-density packaging enabled by super connection technologies, have been promoted, developed, and commercialized in an effort to produce value-added LSIs and these items are accomplished in the SOC plat-form that is de-fact standardized.

However, LSI application systems continue to demand cheaper LSIs with even more diverse functions. To meet these demands, semiconductor manufacturers are on the verge of acquiring technologies that will enable them to create smaller SOC and SIP systems with better performance at a lower price, and they are continuing their efforts to nurture them into flagship products that will offer even more added value. I believe that they will prove to be the next big category of products that will revitalize the semiconductor industry.

2. LSI Application Trends

Fig. 1 shows the evolution of LSI application systems. As the applications progressed from calculators to mobile phones, the hardware followed the trend of smaller and lighter made possible by LSIs with increasing degrees of "high density integration".

At the same time, the focus of product marketing has been shifting to "softer" areas. In other words, the man-machine interface has been making the transition from the keypads first introduced in calculators to voice, picture, and radio waves, which demands that LSIs enable systemization while retaining their "unique" functions.

The priority of the LSI-value has been price, delivery, and characteristic in the past, but now and future it should be

"time to market" "uniqueness". Price and delivery have been negotiable factors at business.

Time to market and uniqueness, SIP has a possibility of these merits, which will be shown later.

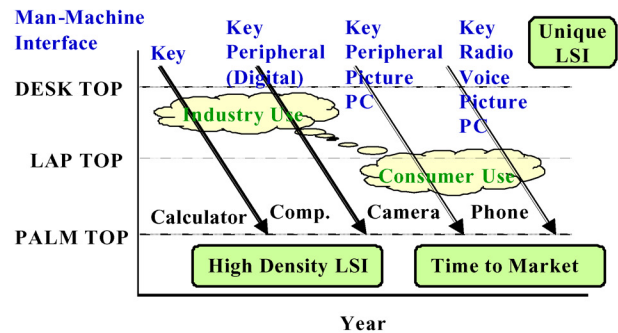**Fig.1 : Generation Change of LSI-Application**
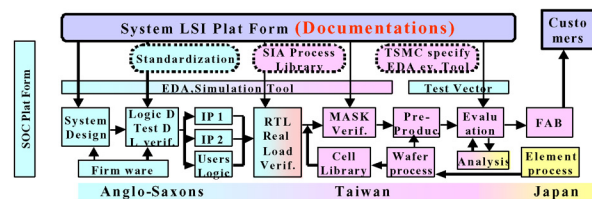

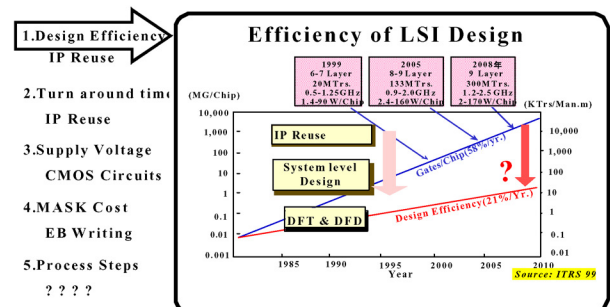**Fig.2 : Plat Form of System LSI**

Fig.3 : Technology Items of SOC

Fig.4 : Table of SOC and SIP

	Commodity (MCM)	SOC	SIP	NEW-SIP
Performance	X	○	△	New Standard SIP-I/O
Power	X	◎	△	
Area	X	◎	○	3D PKG Sup.Conn.
Cost	○	X	△	
Reusability	◎	X	△	In Harmony PKG and New I/O
Modifiability	◎	X	○	
Time to Market	◎	X	○	

SIP: No Excellent No bad ! (No birdie No bogey)

3. SOC Plat Form

The plat-form of SOC has been accomplished by Taiwan and Anglo-Saxon companies (Fig.2), then the high density SOC has been able to design Anyone, Anytime, Anywhere.

That means, nowadays the SOC is commodity and has no unique and less value for the customers.

4. Limitation and Technical Items of SOC

SOC has obligations for high density LSI and process driver, now and future but has too match heavy Items to be resolved such as Design Efficiency, TAT of develop. ,Supply Voltage, MSAK Cost, and Process Steps as shown in Fig.3.

Of course in the worldwide many engineers and researchers are trying to overcome the demerit of SOC but will take more time and money.

5. Raising a head of SIP and its subjects

SOC has many technical items to be resolved ,recently SIP is noticed by the semiconductor industries.

Fig.4 shows the comparisons with SOC and SIP.

As shown, SIP has no bad no excellent that mean SIP can never get the main stream forever.

SIP's demerits are performance and power, Fig.5 shows a new concept of I/O interface of SOC and SIP.

By using this standard I/O protocol we can get high-speed low power SIP and will be compatible for SOC.

I am proposing SIP Consosium of the standardization of I/O interface for SOC and SIP.

6. A Business Model of SOC

As shown in Fig.6 SOC will be a standard product.

SOC is constructed by known IPs, known Tools, standard Cell Library and Standard Process by standardized SOC plat-form documentation.

Anyone, Anytime, Anywhere can do it!

Who makes a profit from SOC ?

Trade company(Shouji Gaisha), not Semiconductor, will get money from SOC.

7. SIP drives a new business model of semiconductor

Fig.7 shows the business model of SOC and SIP.

SOC market will grow up for many applications, which has a need of CPU, DSP, Memory, etc.

But SOC players will be desire for exclusive possession by using own plat form documentation such as McDonald chain store.

This business field, trade companies has good know hows and strong compared with semicon-companies.

On the other hands SIP has excellent capabilities for uniqueness by using SOC and unique IC such as analog.

Fortunately it has no plat form of SIP now,

Only successor of defact standard plat form, can get a profit from SOC and SIP.
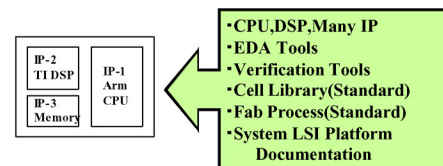
Fig.5 : A New Concept of Standard I/O

micro I/O : **IP to IP** Interface Standard
mini I/O : **Chip to Chip** (SIP) Interface Standard
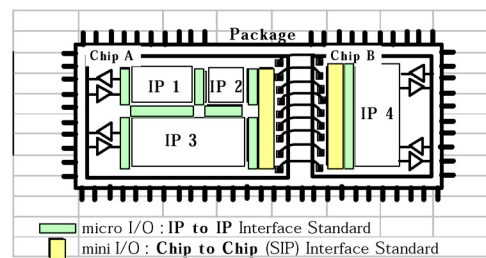
● IP and SIP is same status for the re-usable design properties
● To be determined the I/O specification witch are open protocol
● Both specifications should be same consideration

HITACHI VLSI-Sympo.

Fig.6 : SOC Design

Anyone, Anytime, Anywhere can do it !

·CPU,DSP,Many IP
·EDA Tools
·Verification Tools
·Cell Library(Standard)
·Fab Process(Standard)
·System LSI Platform Documentation

Who makes a profit from SOC?

Fig.7 :Business Model of SOC and SIP