

ANALOG POWER CONVERSION ICs

Enabling Power Management Applications

ABSTRACT

Purpose of this report is to deliver a comprehensive view of the Analog Power Conversion IC market landscape from four major perspectives:

- Power distribution market and technology trends
- Market segmentation and trends (2008 to 2013)
- Comparative vendor data and trends
- Individual vendor analyses

Audiences who will benefit from this report include decision-makers in business development, competitive intelligence, strategic and product marketing, and general management areas.

Power conversion ICs dominate power management market segment. They serve as a foundation for a range of application-specific power products such as LED lighting ICs. Power conversion ICs covered in this report include AC/DC and DC/DC conversion ICs. Included are analyses of 30 vendors and how they address the power conversion IC market. [Power conversion ICs of the 30 analyzed vendors account for 9,024 generic products.](#)

Texas Instruments	Infineon Technologies	Vishay Intertechnology
National Semiconductor	Rohm Electronics	Freescale Semiconductor
Linear Technology	Diodes	Dialog Semiconductor
Maxim Integrated Products	STMicroelectronics	Wolfson Microelectronics
Intersil	Semtech	Marvell Technology Group
Analog Devices	Exar	Microchip Technology
AnalogicTech	Fujitsu Microelectronics	Fairchild Semiconductor
Monolithic Power Systems	Richtek Technology	International Rectifier
Power Analog Microelectronics	Micrel	austriamicrosystems
ON Semiconductor	Sanyo Semiconductor	Active-Semi

[Power conversion ICs market represented about 30B units \(\\$11B revenues\) in 2008](#) with a growth rate of eight percent in the 2008 to 2013 period. Non-isolated DC/DC conversion ICs dominate power conversion products.

[Power factor correction \(PFC\) controllers feature the highest growth rate](#) driven by the increasing need for higher power efficiency in AC/DC power conversion front-ends. This growth is driven by worldwide regulation led by Europe, Japan, and China.

Market for power conversion ICs is [highly fragmented featuring growth rates ranging from 4 to 15 percent in the 2008 to 2013 period.](#) As a result, it is critical to understand the market segmentation of power conversion ICs in order to assess growth opportunities.

[Switching DC/DC converters with integrated DMOS/MOS power switches represent the highest growth segment](#) among non-isolated power conversion ICs.

A common trend among the 30 analyzed vendors is the emergence of digital power solutions in their power conversion ICs product portfolios. Established analog vendors typically acquire digital power know-how and IP, while some vendors have entered the power management market exclusively with digital power products. [There is an increasing trend toward digital power approaches to power conversion ICs, especially in higher power](#)

Product Type	2008 Bunits	2013 Bunits	CAGR %
Front-end AC/DC ICs	3.7	5.7	9%
• PFC controllers	1.5	2.6	12%
• Isolated DC/DC conversion ICs	2.2	3.1	7%
Non-isolated DC/DC conversion ICs	26.6	38.3	8%
• Single-function ICs	25	36	8%
• Multi-function ICs	1.6	2.3	8%
Total	30.3	44	8%

[AC/DC and DC/DC conversion applications](#). We cover these trends in-depth in our new report titled Digital Power ICs: Emerging Power Management Market Opportunities.

The report is structured into six Sections.

Section One provides an overview of the report coverage.

Section Two serves as an executive summary providing key findings and implications.

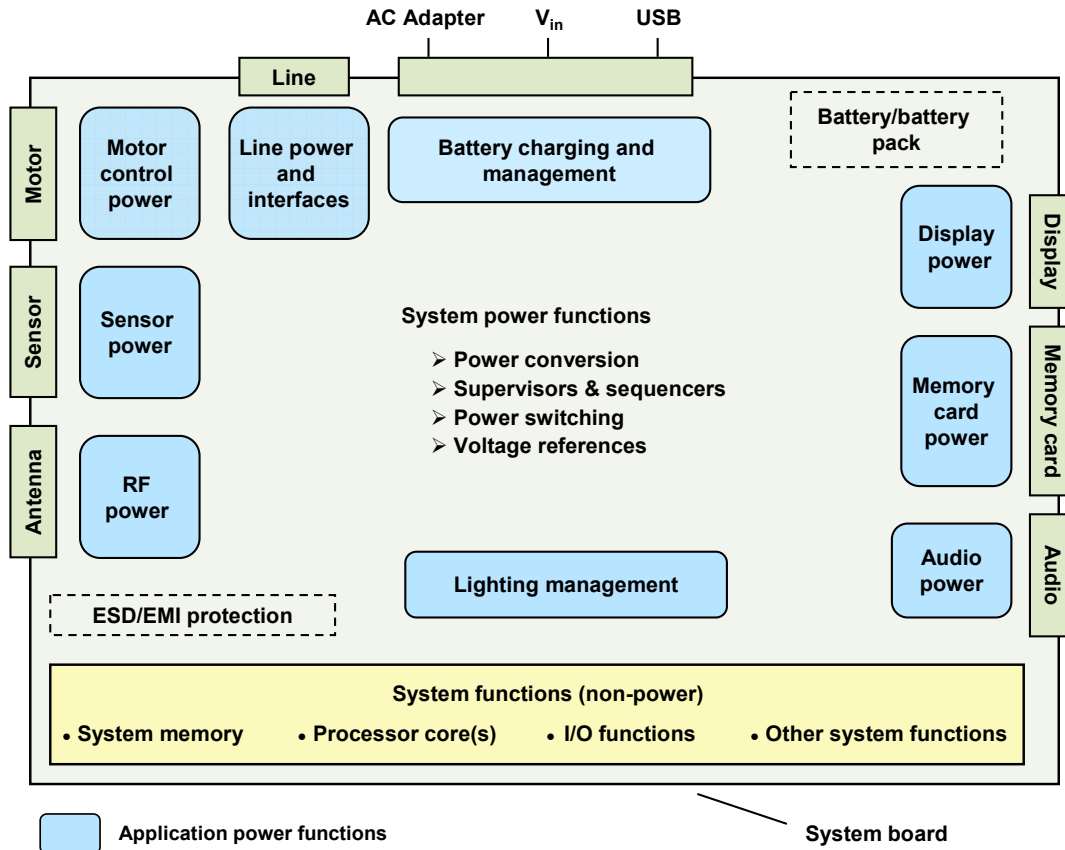
Section Three scopes the power distribution market and technology trends from six major perspectives:

- Power efficiency, density, and cost trade-offs
- Power distribution architecture trends
- Power conversion topology trends
- Power conversion component and material trends
- Power supply packaging trends
- Power building blocks for the intermediate bus architecture (IBA)

Power conversion IC and technology trends are tightly linked to power system architecture trends. This section provides insights into these trends and their implications for power conversion ICs.

Section Four introduces:

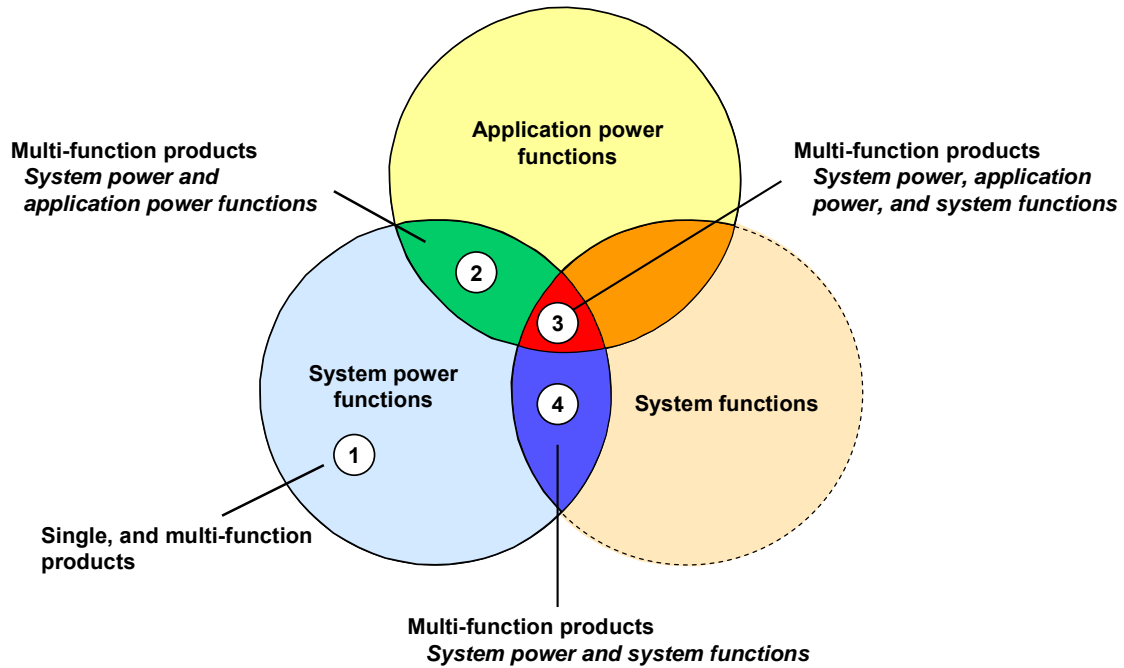
- A generic model of end-equipment power management functions



- Four integration domains which [encompass all power conversion products](#).

Integration domain 1 contains the majority of DC/DC conversion ICs dominated by single-function products featuring one or two channels, i.e., building-block functions of power systems.

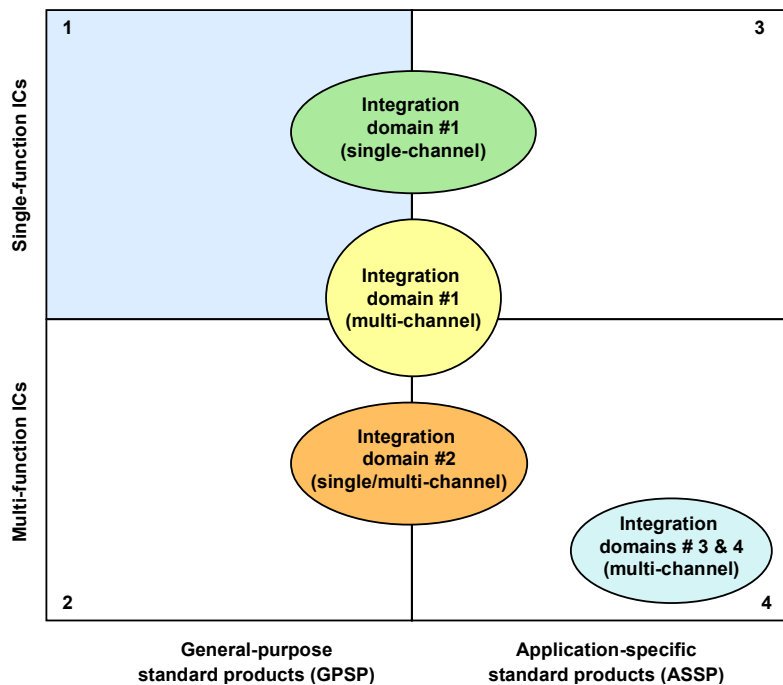
Integration domains 2 and 3 follow in terms of unit volume and are dominated by products integrating battery charging and/or audio functions with integration domain 1 functions.



- Four power conversion IC market segments

This market segmentation of power conversion ICs represents a pragmatic (useable) market analysis framework that enables a systematic approach to assessing power conversion IC market trends.

This report section focuses on non-isolated DC/DC converters by covering both single-function and highly integrated multi-function products as well as general-purpose and application-specific products.



Section Five delivers analyses of 30 power conversion IC vendors. It provides 16 comparative data maps revealing their positions on the competitive landscape as well as business focus areas. Vendor comparisons extend from target end-market segments to power conversion IC topologies, design implementations, performance and application attributes, and process technologies (a sample vendor map is shown in figure on the next page).

The 16 vendor data maps cover the following product attributes:

- Topologies (buck, boost, buck/boost, other)
- Number of channels (1, 2, 3, 4, >4)
- Load current ranges (0.5A, 1A, 1.5A, 2A,>2A)
- Input voltage ranges (10V, 25V, 40V, 55V, >55V)
- Output voltage ranges (10V, 25V, 40V, 55V, >55V)

Section Six covers each of the 30 vendors in terms of:

- Annualized revenues
- Relevant business trends
- Power conversion ICs product portfolio (a sample is shown at right, for Semtech)
- Technology and manufacturing trends

MAP-1: Comparison of Analog Power Conversion IC Vendors by Key Product Portfolio Attributes

Product Type	Generic products	% of total	% of grand total
Front-end AC/DC conversion ICs (isolated)	18	100%	8%
▪ PFC controllers	0	0%	
▪ DC/DC conversion ICs (isolated)	18	100%	
Single-function DC/DC conversion ICs (non-isolated)	197	100%	88%
▪ Inductor based	115	58%	
▪ Charge pump	26	13%	
▪ Linear/LDO	56	29%	
Multi-function ICs	9	100%	4%
▪ Inductor based with LDO	9	100%	
▪ Inductor based with LDO and other functions	0	0%	
▪ Inductor based with other functions	0	0%	
Grand total	224	—	100%

Vendor	General purpose	Application specific	Single-function			Multi-function	Power switch			
			Inductor based	Charge pump	Linear/LDO		Internal	External	DMOS/MOS	Bipolar
TI	●	◐	◐	◐	●	◐	●	◐	●	
National	●	◐	◐	◐	◐	◐	●		●	◐
Linear	●	◐	●	◐		◐	●	◐	◐	◐
Maxim	●	◐	●	◐	◐	◐	●	◐	●	
Intersil	●	◐	●	◐	◐		◐	●	●	
Analog Devices	●	◐	◐	◐	◐	◐	●	◐	●	◐
AnalogicTech	●	◐	●		◐	◐	●		●	
MPS	●		●	○	◐	◐	●		●	
PAM	●		◐		◐		●		●	
ON Semiconductor	●		◐	◐	●		◐	◐	◐	●
Infineon		●	◐		●	◐	●	◐	●	
Rohm	◐	◐	◐		●	◐	●	◐	●	
Diodes	●		◐		●		●	◐	●	◐
STMicroelectronics	◐		●	◐	◐	◐	●	◐	●	
Semtech	●		●	◐	◐	◐	◐	●	◐	◐
Exar	●		◐	◐	◐		●	◐	●	◐
Fujitsu ME	◐	●	●			◐	◐	●	●	
Richtek	●		●		◐	◐	◐	◐	●	
Micrel	●	◐	◐		●	◐	●	◐	●	◐
Sanyo	●	◐	●	◐	◐	◐	◐	◐	●	◐
Vishay	●		◐	○	◐	○	◐	●	●	
Freescale	◐	◐	◐		◐	◐	●	◐	●	
Dialog	○	●				●	●		●	
Wolfson ME	○	●				●	●		●	
Marvell	●		●			◐	●		●	
Microchip	◐	◐	◐	◐	●	◐	◐	●	●	
Fairchild	●		◐	◐	●		◐	◐	●	
IRF	●		◐		●		◐	●	●	
AMS	◐	◐	◐	◐	◐	◐	●		●	
Active-Semi	◐	◐	●			●	●		●	

Legend: ○ Entry ◐ Select ◑ Significant ● Focus

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