TEXAS INSTRUMENTS — POWER MANAGEMENT STRATEGY

ABSTRACT

This report delivers an in-depth and comprehensive coverage of TI's power management business, products, and technologies from a range of perspectives including:

- TI's position and performance in Power ICs
- Power IC fit and role with TI's overall business
- Areas of thrust, product development, and leverage
- Business and product portfolio segmentation
- Product portfolio analyses by product category of about 3,400 generic standard products
- Process technology and manufacturing strategy and trends

TI is the undisputed market leader and trend setter in power management. TI broadly covers all Power IC market segments. Standard Power ICs represent the highest growth part of TI's Analog Group which itself represents 51 percent of TI's semiconductor revenues, 40 percent of operating profits, and 94 percent of all standard products.

The Power IC landscape is rapidly evolving – new technologies are being developed, new competitors are entering the Power IC market, new market segments and applications are opening up -- often with unique requirements. Even well established mega-markets are changing process technologies that are used – driven, for example, by the integration of added sensor functionality.

An in-depth understanding of product lines, actions, and positioning a leading Power IC vendor helps the assessment of the Power IC market potential and development of strategies for its various growth segments such as smart grid, digital power, LED lighting, energy harvesting, wireless power transmission, and many others.

This report provides a valuable resource for business strategy and development and product marketing professionals in the power management area.

The report is structured into eight parts.

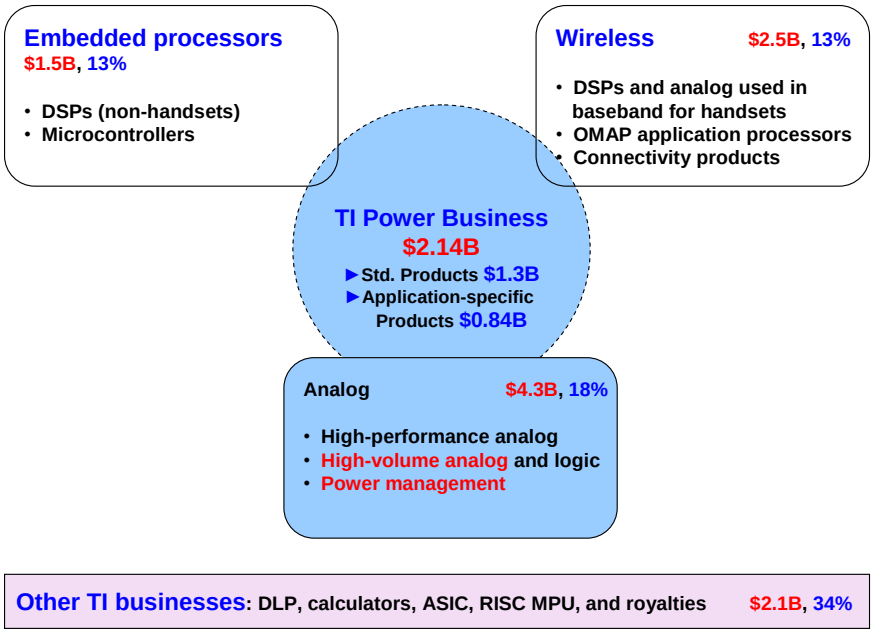
Section 1 provides an introduction and overview of the report.

Section 2 delivers key findings and implications that serve as an executive summary. Our latest in a series of in-depth analyses of Texas Instruments confirms that its current strategic leadership and future financial revenue and profitability performance in Power Management ICs are significantly underestimated.

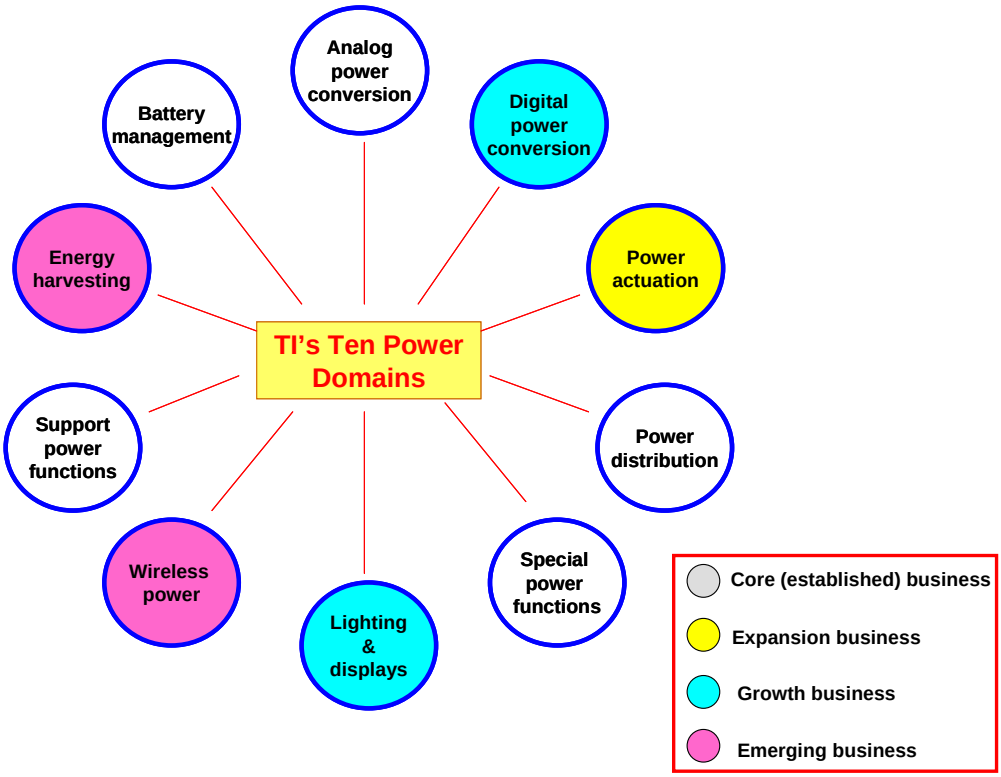
TI 2009 Power Management ICs Revenues ($B) and MS			
	TI	Total Market	TI 2009 Market Share
Total Power ICs	**2.14**	**17**	**13%**
General-purpose (Standard)	**1.3**	**7**	**19%**
-- Digital Power	0.07	0.58	12%
Application-specific	**0.84**	**10**	**8%**

Section 3 provides an overview of TI's business segments and strategy with an emphasis on power management. This section explores how TI leverages the power management business and provides insights into financial performance by business segment and product category.

Total TI 2009 revenues: $10.4B
Operating margin: 19%



Section 4 introduces our segmentation of TI's power products into ten power domains—five of which address high and emerging growth market opportunities. These include digital power, lighting and display power, energy harvesting, and wireless power. This section provides an overview of TI's product portfolio and revenue by product category as well as integration trends.

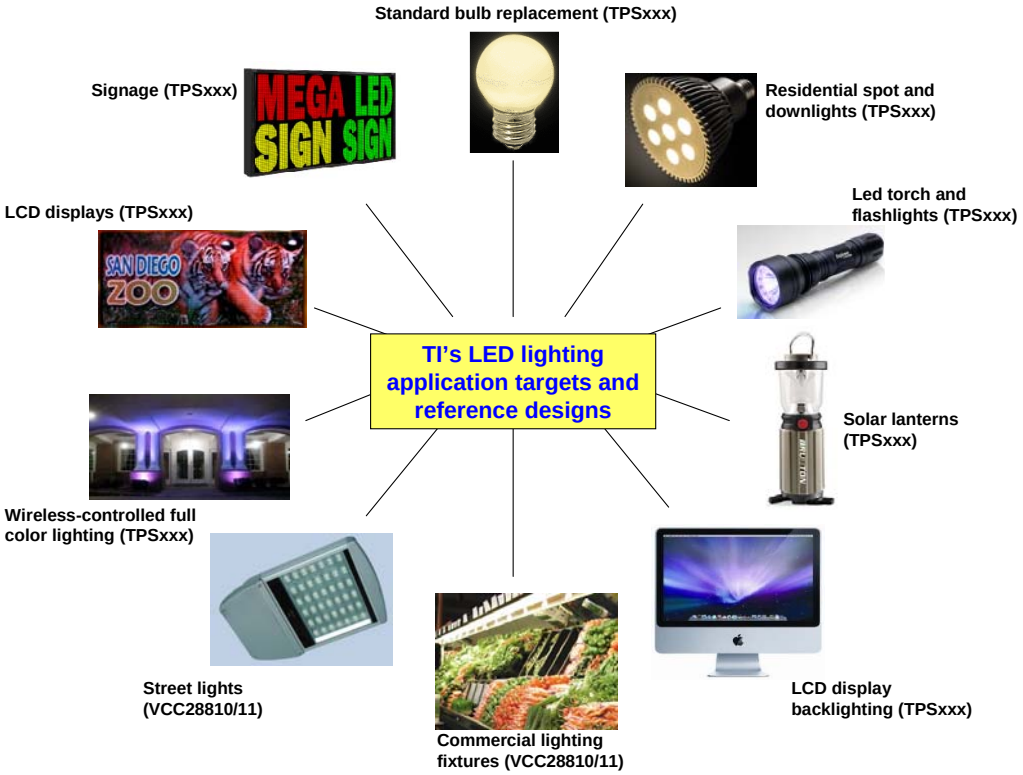


Section 5 analyzes in depth five core power domains. Key product lines and market segmentation are analyzed, including analog power conversion, power actuation, power distribution, battery management, special power functions, and the support power functions domain.

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	●		●	○	◔	◔	●		●	
Infineon		●	◑		●	◔	●	◑	●	
Rohm	◑	◑	◑		●	◔	●	◑	●	
STMicroelectronics	◑		●	◔	◑	◔	●	◔	●	

Power Domain	Number of Generic Standard Products	% of total	Standard Products Revenue ($M)	% of total	Dominant product types
Analog power conversion	**2,154**	**62%**	**750**	**58%**	Non-isolated DC/DC converters
Support power conversion	407	12%	140	11%	
Power distribution	241	7%	70	5%	
Battery management	223	6%	80	6%	Battery charger ICs
Lighting displays	160	5%	70	5%	LED drivers
Power actuation	118	3%	50	4%	Power MOSFET drivers
Digital power conversion	75	2%	70	5%	Non-isolated DC/DC converters
Special power functions	64	2%	50	4%	Motor control
Energy harvesting	41	1%	20	2%	Solar energy products
Wireless power	1	0%	0	0	First product introduction
Total	**3,484**	100%	**1,300**	100%	

Section 6 focuses on high growth power domains including digital power and lighting and the display power domain. It provides insights into the strategic significance of digital power technology for TI's future growth and profitability.



Section 7 focuses on the emerging growth power domains including energy harvesting and the wireless power domain and how TI addresses these new market opportunities

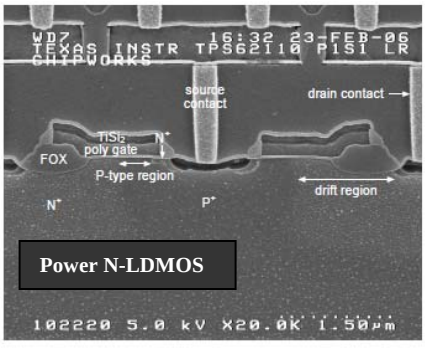
Section 8 focuses on TI's process technologies and manufacturing strategy. The state-of-the-art modular power BiCMOS-DMOS (BCD) process technologies and consolidation of manufacturing provide TI with a distinct and decisive competitive advantage. LBC7 (250nm, 40V) is the current workhorse BCD process introduced in 2005. It generates about 40 percent of TI's total analog production and is dominated by power management ICs—both standard and application specific.

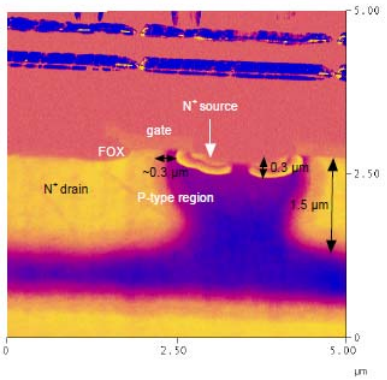
Process Modularity

Power domain	Major product type	CMOS	Bipolar	BiCMOS	BCD
Analog power conversion	Isolated AC/DC and DC/DC power supplies				
	• PWM power supply controllers	–	46%	18%	36%
	• Power factor correction (PFC) ICs	–	34%	–	66%
	• Power supply support	–	75%	25%	–
	Non-isolated switching DC/DC ICs				
	• DC/DC converters (integrated switch)	–	9%	54%	37%
	• DC/DC controllers (external switch)	–	11%	89%	–
	• Charge pumps (inductorless regulators)	–	–	100%	–
	Linear regulators				
	• LDOs	–	13%	61%	26%
	• Standard	–	100%	–	–
	Integrated power management units	5%	–	–	95%
Digital power conversion	• Digital power controllers	100%	–	–	–
	• Digital power control drivers	–	–	–	100%
	• Digitally managed analog PWM controllers	–	–	–	100%
	• Digital power monitoring and sequencing	100%	–	–	–
	• Microcontrollers (Piccolo family)	100%	–	–	–
Power actuation	• Power MOSFETs	–	–	–	Specialty
	• MOSFET driver ICs	–	–	–	100%
Power distribution	• Power-over-Ethernet ICs	–	–	–	100%
	• Hot swap controllers and switches	–	4%	38%	58%
	• USB and PCMCIA controllers and switches	–	–	–	100%
	• Power muxes and current limited switches	–	–	–	100%
Special power functions	Motion/motor control, other	53%	15%	22%	10%
Lighting and displays	LED drivers, photo-flash capacitor chargers, HID lamp controllers, CCFL backlight converters, LCD/OLED display bias ICs	–	4%	68%	28%
Wireless power	Inductor couples wireless chargers	n/a	n/a	n/a	n/a
Support power functions	• Voltage supervisors	100%	–	–	–
	• Voltage references	–	100%	–	–
Energy harvesting	• RF SOCs and low power RF ICs	–	–	100%	–
	• Microcontrollers (MSP430FSF5xx family)	100%	–	–	–
Battery management	• Charge management	–	4%	35%	61%
	• Fuel gauge, protection, authentication	89%	–	–	11%

Section 8 takes an in-depth view of the TI's workhorse modular BCD process (LBC7) used to manufacture about 40 percent of the analog products.

Courtesy of Chipworks





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