

## **Digital power ICs represent high growth opportunities for IC vendors and wafer foundries, says Petrov Group**

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After decades of missed predictions and hype, the market for digital power ICs has now entered a high-growth stage driven by new applications and the emergence of power buses and focused fabless vendors, according to the Petrov Group. Expected growth for 2009-2014 in the various digital power IC market segments ranges from 30% to 50% per year.

"Digital power ICs are not new but their acceptance has been slow because the power supply industry is very conservative. For example, the transition from linear voltage regulators to switching DC/DC conversion ICs took place over decades," noted Boris Petrov, president of the Petrov Group.

The high growth stage of digital power products comes primarily at the expense of legacy analog power conversion solutions. New fabless entrants are the "Barbarians at the Gate," without sympathy for cannibalization of legacy product revenues. There is also significant new high growth revenue driven by LED lighting and renewable energy applications, the Petrov Group noted.

Market penetration rates in 2009 were low, ranging from less than 1% to 8%. However, this complex power IC market has typically been significantly underestimated and suffers from much hype and misunderstanding. There are several causes of this market size underestimate, including that revenues of pure-play vendors, like Volterra's, are readily visible while those of major IDMs are far less so, said the Petrov Group.

The Petrov Group noted that its findings are based on primary bottom-up research of 22 vendors. "Only such a bottom-up analysis of vendor products can result in an independent and pragmatic validation of market size, growth, and especially of market segmentation," stressed Petrov.

Moreover, digital techniques for power management and control solutions in electric motors have been used since the early 1980s; however, the segment is typically overlooked. Power-One, a company which brings in revenues of more than US\$400 million, sells complete power systems and modules using its own proprietary digital power ICs.

There are five main integration approaches to implementing full digital power conversion solutions ranging from discrete to modules. Each integration approach features a range of integration variants, some of which require specialized processing technologies.

From the power supply system viewpoint power conversion ICs are analog power devices. Digital power conversion devices use digital design techniques to implement the feedback control loop and the associated power management functions; the power stages used to deliver power to loads remain the same as in analog power conversion devices. Hence, the high fragmentation nature of the analog market remains unchanged, according to the Petrov Group. New elements are product-level oriented – a smaller number of configurable products are required to support a broader range of applications and there is a high degree of design flexibility. In summary, digital power IC vendors must possess extensive analog business know-how in addition to digital design know-how.

The proliferation of digital power control ICs has a range of significant implications for silicon foundries, noted The Petrov Group. Practically all new market entrants are fabless companies. Digital power ICs are also strongly integration driven.

The need for integration is driven by a higher design complexity when compared to traditional analog designs. This trend enables foundries to leverage their finer node CMOS-based processes. Moreover, digital power ICs are "platform" based products; a device can be programmed for use in a range of applications. As a result, the volume per product type could be significantly higher than in the case of traditional analog power ICs.

Finally, digital power IC design implementations typically feature common process technology requirements, which is different from traditional analog power ICs. As a result, foundries can use a common process technology platform for a broader range of product types and IC vendors, the Petrov Group noted.

<b>Petrov Group: Digital power IC market growth trends, 2009-2014</b>	
<b>Segment</b>	<b>CAGR</b>
Digital power management (DPM) ICs	30%
Digital power control (DPC) ICs	34%
-- AC/DC and DC/AC power conversion ICs	35%
-- Switching DC/DC power conversion ICs	35%
--Controllers	30%
--Converters	46%
Total	34%

Source: The Petrov Group, compiled by Digitimes, February 2010

Petrov Group: Primary end-equipment applications for digital power ICs								
IC Vendor	High-end				Solar, lighting	Power over Ethernet	Motor control	High-end consumer
	Computing	Storage	Networking	Telecom				
Texas Instruments	x	x	x	x			x	
Microchip	x	x		x			x	
Exar	x	x	x	x				x
Akros			x	x		x		
iWatt			x		x			x
Powervation	x	x	x					
CHiL Semiconductor	x	x						
Fairchild	x		x	x	x			x
Intersil	x	x	x	x				
Freescale							x	
Silicon Labs			x				x	x
Infineon	x	x	x	x				
Maxim	x	x	x	x				
Linear Technology	x		x					
Analog Devices	x		x	x				
International Rectifier							x	
STMicroelectronics					x		x	
Marvell	x	x	x	x				x
Volterra	x	x	x					x
Summit Microelectronics								x
IDT		x	x					

Source: *The Petrov Group*, compiled by *Digitimes*, February 2010

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