

Power Conversion Solutions for powering next generation microprocessors



- Pentium^(R) level microprocessors have created new requirements for high performance and cost-effective power conversion
- Output voltages dropping to 3.3V and lower...increasing output currents over 10A...fast transient responses greater than 30A/µsec...all placing new demands for efficient and low-cost DC/DC converters and power semiconductors.
- IR's expertise in both power semiconductors and power conversion circuits gives us a unique opportunity to work with our customers to address these needs.
- As a result, we are creating complete power conversion solutions using state-of-the-art power semiconductors targeted to meet the performance requirements at the lowest possible cost...and reduce our customers' design time and effort.



Power Conversion for the Pentium^(R) Pro

- A complete, *turnkey* power supply reference design to meet the requirements of Pentium Pro^(R) microprocessors
 - Synchronous buck regulator design operating at 200kHz
 - 13A cont. output current, 2.0-3.5V selectable output (via a 4-bit DAC)
 - Greater than 92% efficiency
 - In excess of 30/µsec transient load response
 - Short-circuit protection, over-voltage protection, power good output
 - One design meets requirements of <u>all</u> Pentium Pro class processors

(155MHz Pentium all the way up to 266MHz Klamath)

... or use lower cost FETs with the same design to save \$\$\$

- All of the above captured in a complete, reference design which includes:
 - -Complete schematic and board layout (available in Gerber format)
 - –Demonstration board (evaluated in hi-volume mfg. environment)
 - -Complete power supply performance evaluation data
 - -Detailed bill-of-materials with supplier information
 - -Complete evaluation kit available . . . order as IRP6VRM1-EV Pentium^(R) is a registered trademark of Intel Corporation



IRP6VRM1 Performance Results



Efficiency easily exceeds 80% across the full output voltage and current range with a peak over 92%.



Excellent loop characteristics keep the output voltage within +/-5% under transient load at 100Hz.



The output voltage is regulated to within 1% of 3.5V set point from no load to full load.



Low ESL of the output capacitors and good board design result in output voltage regulation of +/-5% under transient load at 100kHz.



FETKY[™] for Synchronous Rectification

 As a synchronous rectifier, the industry's first FETKY (Gen 5 FET + Schottky CoPack) reduces stray inductance between FET and Schottky improving efficiency while reducing board space and assembly cost.



Sources of	Discrete	
Inductance	Solution	Fetky
D ² Pak leadframe & wires	6.5nH	3.5nH
PCB traces	3.5nH	n/a
SMB leadframe	2nH	n/a
Total	12nH	3.5nH

Inductance between the MOSFET and Schottky is reduced by ~75% compared to a discrete solution

Use of a FETKY in place of a MOSFET increases efficiency by 1-2% reducing total losses by up to 25%

 When compared with two SO-8 MOSFETs (Si4410 or IRF7413) in parallel and one SMB Schottky, the *FETKY* offers similar current-handling but at 25% lower component cost and only one device to assemble instead of three!

IRL3103D1/S	30V, 0.014ohm Gen 5 Power MOSFET plus
<i>FETKY</i> TM	30V, 0.42V @ 1A schottky in TO-22072ak