

The era of artificial intelligence and deep learning has driven the vigorous development of the datacenter, cloud computing, and edge computing markets. These areas are becoming a large market for field programmable gate array (FPGA) solutions, especially in edge computing (see Figure 1).



Figure 1: FPGA Solutions

As a leader in the FPGA field, [Xilinx](#) has launched various platform design solutions for a wide range of applications, especially in the field of wireless communication and artificial intelligence (see Figure 2). As the power design requirements of high-performance FPGAs continue to increase in complexity, power supply engineers begin to face more challenges. Power requirements are increasing substantially, especially for the core rails. The need for higher power density, higher efficiency, and faster transient solutions are key to maximizing FPGA performance.



Figure 2: Xilinx Solutions

Compared to discrete solutions, MPS power modules have high operating efficiency and minimize the circuit board area. MPS power modules mount the regulator, inductor, and passive components directly on the lead frame (see Figure 3). This layout reduces circuit parasitics and provides the most thermally efficient connection to the PCB, while also enabling fast switching frequencies and transient response. This makes MPS modules ideal for FPGA applications where power density, performance, low ripple, and high efficiency are needed. MPS has the broadest portfolio of power modules in the industry, spanning more than 100 parts and counting.



In this [reference design](#), MPS used several popular power modules:

The MPM3695 series offers a 10A and 25A family of power modules. These modules provide a universal solution for FPGA power supplies. The MPM3695 series can expand the output current by stacking multiple MPM3695-25 or MPM3695-10 modules in parallel to increase the current output and maximize transient response.

Compared to discrete point-of-load (POL) solutions, the MPM3695 series can improve power density by up to 60%, which not only simplifies PCB layout and power stage design, but also minimizes the need for external components and reduces solution size. Because they are monolithic power ICs with custom integrated inductor designs and leading package technology, the MPM3695 series boasts a total solution size that is 40% smaller than the discrete approach.

MPM3632C

The [MPM3632C](#) is a compact, low-noise, 3A module solution. This compact 3mmx5mmx1.6mm solution provides 18V and 3A forced continuous conduction mode (CCM) from a single-output power module. The MPM3632C only requires input and output capacitors to complete the solution. It supports a wide input voltage range, 3A of continuous output current, and has excellent load and line regulation. The simplicity of this solution, along with its high performance, can significantly improve time-to-market for any product.

MPM3606A

The [MPM3606A](#) provides design flexibility with a family of pin-compatible modules. The MPM3606A is a 21V, 0.6A power module — and is part of a family of pin-compatible 1A, 2A, and 3A power modules. This is highly beneficial because it provides the power designer with the flexibility to design using one part in the family, and then optimize the module once the final power requirements are determined.

MPS power modules integrate our industry-leading voltage regulators, along with their inductors and passive components, into a single package. With this approach, power designers can be confident they will achieve high efficiency, ultra-fast transient response, and low noise, while minimizing PCB board space and design complexity. With our vast portfolio of solutions, MPS modules provide the most design flexibility, allowing designers to scale a solution up or down depending on the FPGA final design requirements. Because of these benefits, MPS modules are an optimal solution for Xilinx FPGA applications.