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# Microchip Technology's Pure Sine Wave Uninterruptible Power Supply (UPS) Reference Design Demonstrates Digital Power Advantages

## Reference Design Showcases Lower Cost, Smaller Size, Greater Efficiency and Programmability of Implementing UPS with Digital Power

CHANDLER, Ariz.--(BUSINESS WIRE)-- Microchip Technology Inc. (NASDAQ: MCHP), a leading provider of microcontroller and analog semiconductors, today announced its [Pure Sine Wave Uninterruptible Power Supply \(UPS\) Reference Design](#), which is based on the dsPIC33F "GS" series of [digital-power](#) Digital Signal Controllers (DSCs). This reference design demonstrates how digital-power techniques--when applied to UPS applications--enable easy modifications through software, the use of smaller magnetics, intelligent battery charging, higher efficiency, compact designs, lower audible and electrical noise via a purer sine-wave output, USB communication and a lower overall bill-of-materials cost. Though not available for purchase, all of the documentation, software and Gerber files needed to build this reference design can be obtained for free from Microchip's Web site at: <http://www.microchip.com/offlineups>. Additionally, demonstration units are available from the Company's field sales force.

To watch an overview video of this UPS Reference Design, visit: <http://www.youtube.com/watch?v=Chc2VD4fV10>.

Microchip's UPS Reference Design utilizes high-frequency switching techniques to implement three optimized digital power-conversion stages. The Push-Pull DC/DC Converter stage boosts the battery voltage to drive the inverter stage. The Full-Bridge Inverter stage creates Pure Sine Wave AC power to the load. Finally, the Flyback Switch-Mode Charger charges the battery from the AC line power.

The dsPIC33F "GS" series of digital-power DSCs from Microchip is the heart of this Offline UPS reference design. The dsPIC33F controls all critical operations of the system, as well as the housekeeping operations. Fast and reliable switchover from mains to inverter, and vice-versa, is done intelligently to ensure that power to the load is transferred without surges and sags. The reference design also features USB connectivity and an LCD panel, for communication with the external world.

"This reference design jumpstarts our customers' advanced UPS designs and brings the benefits of digital power to their products quickly," said Sumit Mitra, vice president of Microchip's High Performance Microcontroller Division. "It uses the flexible dsPIC33F 'GS' series of DSCs, which enables easy customization and configuration through simple modifications to the control software."

Digital Power brings many benefits, such as enabling greener power via smarter and more efficient systems. It can lower the carbon footprints of many UPS designs, and help ease the burden on the world's strained power grids. Additional key design specifications include:

- Input Range AC:
  - o 85 to 135V, 60 HZ +/-3
  - o 145 to 280V, 50 HZ +/-3
- Output Voltage AC:
  - o 110V @ 60 Hz +/-3
  - o 220V @ 50 Hz +/-3
- DC Input:
  - o 36V (12 VDC x3)
  - o Lead Acid Battery
- Adjustable Charging Current
- Efficiency >85%
- Pure Sine Wave Output With THD <5%
- Rating:
  - o 1000 VA Steady-State Output Power
  - o 1350 VA Peak Power (Surge)
- Mains to Battery Transfer Time <10ms
- Supports Crest Factor of 3:1
- Fault Indications

## Availability

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## Microchip Customer Support

Microchip is committed to supporting its customers by helping design engineers develop products faster and more efficiently. Customers can access four main service areas at <http://www.microchip.com>. The Support area provides a fast way to get questions answered; the Sample area offers free evaluation samples of any Microchip device; microchipDIRECT provides 24-hour pricing, ordering, inventory and credit for convenient purchasing of all Microchip devices and development tools; finally, the Training area educates customers through webinars, sign-ups for local seminar and workshop courses, and information about the annual MASTERS events held throughout the world.

## About Microchip Technology

Microchip Technology Inc. (NASDAQ: MCHP) is a leading provider of microcontroller and analog semiconductors, providing low-risk product development, lower total system cost and faster time to market for thousands of diverse customer applications worldwide. Headquartered in Chandler, Arizona, Microchip offers outstanding technical support along with dependable delivery and quality. For more information, visit the Microchip website at <http://www.microchip.com>.

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