# Wireless Power Solutions

A large number of applications are now emerging for wireless charging, particularly in consumer electronics, with manufacturers wanting to replace charging cables with faster and more convienient solutions. Microchip's dsPIC® Digital Signal Controllers (DSCs), with their multiple Pulse-Width Modulators (PWMs), high-speed Analog-to-Digital Converters (ADCs) and programmable core, are very effective in optimizing wireless charging solutions.
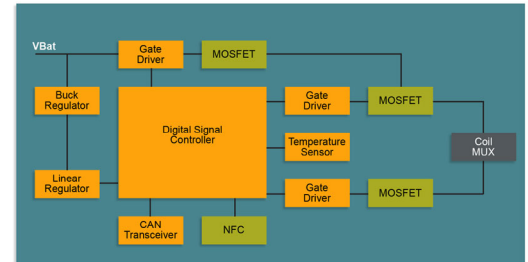

Wireless charging works by transferring energy from the charger to a receiver via electromagnetic induction. The charger uses an induction coil to create an alternating electromagnetic field, which the receiver coil converts back into electricity to be fed into a battery or directly to an application. Typically, the charger and receiver should be close and correctly aligned over the top of each other, although a set orientation is normally not necessary.

Developed by the Wireless Power Consortium, "Qi" is an open interface standard that defines wireless power transfer using inductive charging over distances of up to 4 cm. A Qi-based wireless charging system uses resonant inductive coupling to enable a charging pad to transfer power to a compatible device when it is placed on top of the pad.

dsPIC33 Digital Power Conversion Products

◆ Streamlined interoperation between PWM, ADC and CPU

◆ High-performance core with DSP instructions
  o High-speed control loop execution for demanding power conversion applications
  o Fast and predictable interrupts

◆ Dual core and Single core dsPIC33C DSCs with up to 100 MIPS performance
  o Slave core implements control loop executing latency critical compensator algorithms
  o Master core runs PMBus stack and system-level functions
  o Design different functions separately and integrate them seamlessly

◆ High-resolution PWMs for digital power
  o 250 ps for duty cycle, phase shift, period and dead time for high switching frequency designs
  o Flexibility to control numerous power topologies
  o Configurable PWM Control Inputs for hardware response to external events that reduces control latency

◆ Live update features
  o Update all of the firmware without downtime

◆ Maximum analog integration including high-speed ADCs, DACs with waveform generation, comparators and PGAs

◆ 18–100 pins and packages as small as 4 × 4 mm
  o Robust packages to ease IPC-9592B qualification
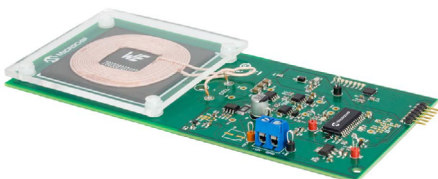
To help jump start your development, Microchip offer a range of reference designs for 15W single- and multi-coil Qi-compliant transmitters.

For applications that may require higher wattage, we also offer the 200W/300W Wireless Power Reference Design that implements a proprietary protocol that is ideal for applications such as power tools, robotic vacuums, industrial slip rings, small electric vehicles and drones.

Design-in Expertise and Service

Recommended Microchip Products

dsPIC Digital Signal Controllers

Product	Core	Number of Pins	Program Flash (KB)	RAM (KB)	IC/OC/ MCCP/SCCP	SMPS PWM	ADCs	Number of Op Amps/ PGAs	Number of Analog Comparators	Number of UART/I2C/ SPI Interfaces
dsPIC33EP 'GS' Family	70 MIPS Single Core	Up to 80	Up to 128	Up to 8	4/4	16 Channels 1 nS	22 × 12-bit, 5x S/H	2	4x	2/2/3
dsPIC33CK 'MP' Family	100 MIPS Single Core	Up to 80	Up to 256	Up to 24	9	16 Channels 250 pS	24 × 12-bit, 3x S/H	3	3	3/3/3
dsPIC33CH 'MP' Family	100 MIPS Dual Core	Up to 80	Up to 512/72	Up to 48 + 16	8 + 4	8+4 Channels 250 pS	18 × 12-bit, 4x S/H	3	3	3/3/3

Legend
IC = Input Capture
OC = Output Compare
MCCP = Multiple Capture/Compare/PWM
SCCP = Single Capture/Compare/PWM
SMPS PWM = Power Supply Pulse Width Modulation

Voltage Regulators

◆ MAQ5281 – High-performance, low dropout regulator, 25 mA, 120V, adjustable Vout from 1.27 to 5.5V.

◆ MCP1790 – 30V, 70 mA, load dump protected linear voltage regulator

◆ MCP16311 – 30V, 1A PFM/PWM high-efficiency synchronous buck regulator

◆ MCP16331 – 50V 1A non-synchronous buck regulator

CAN Transceivers

◆ ATA6562 – High-speed CAN FD transceiver with standby and silent mode and WUP

◆ MCP2561FD – High-speed CAN FD transceiver with standby mode and SPLIT pin

◆ ATA6570 – High-speed CAN FD transceiver with Partial Networking

Temperature Sensors

◆ MCP9700A – Low-power linear active thermistor IC, analog output

◆ MCP9800 – 2-wire high-accuracy temperature sensor, digital output

◆ MCP9504 – Temperature switch with selectable hysteresis

MOSFET Drivers

◆ MIC4607 – 85V, three-phase MOSFET driver with adaptive dead-time, anti-shoot-through and overcurrent protection

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