1. KEY FEATURES

- Wide input voltage range from 3.8V to 24V
- Power transfer: up to 50W
- Compliant with WPC Qi specification v1.2.4 with proprietary protocol support
- Embedded 32-bit ARM M0® processor with QEC-100 certified 64KB e-Flash and 4 KB SRAM
- QC2.0/QC3.0, FCP/SCP and USB PD fast charging power adaptor support
- Integrated three pairs of N-MOSFET drivers
- Expandable coil matrix support with external MOSFET drivers (MT5603)
- Integrated high voltage Buck converter to reduce transmitter's power consumption in high voltage input cases
- Integrated 3.3V LDO for internal and I/O power supplies
- Integrated 1.5V LDO for core power supply
- Precise low-side current sensing function for FOD and current mode demodulation
- 4 channels demodulation AFE for voltage and current mode demodulation, support multi-Tx application
- 16 channels dedicated DSP for robust ASK demodulation
- Dedicate FSK modulation hardware with programmable modulation depth
- 2 high performance PWM generation modules with 6 channels PWM output for each module, both with programmable dead time control
- Integrated 32KHz oscillator
- Integrated Watchdog for sleeping power monitor and wake-up
- Integrated 60MHz/120MHz programmable oscillator for system and PWM generation
- Supports 8~24MHz XTAL
- Integrated 440~660MHz programmable PLL for high performance PWM generation
- Build-in 10bit ADC for voltage, current and temperature measurement
- Build-in 10bit DAC with output buffer
- Low operating current
- Supports SWD, I2C and UART debug mode
- Supports I2C, UART and SPI Interface with plenty of GPIO's
- Dual VDD_IO pins for flexible I/O levels
- Over-voltage/current/temperature protection
- Input under-voltage detection and lockout function
- Halogen free and RoHS compliant
- Available in 6mm x 6mm QFN48 package

2. APPLICATIONS

- WPC compliant wireless power transmitters for smart phones and wearable devices
- Medical, home appliance and industrial applications
- Car and other vehicle accessories
- Other wireless power applications

3. DESCRIPTION

MT5815 is a highly integrated, high performance System on Chip (SoC) for magnetic induction based wireless power transmitter solutions. It is fully compliant with WPC Qi v1.2.4 specification, with both Baseline Power Profile (BPP) and Extended Power Profile (EPP) support. The integrated large size e-FLASH enables flexible customer function support.

MT5815 integrates high voltage Buck, two LDO's, three pairs of N-MOSFET's drivers, four channels of ASK demodulation Analog Front End (AFE), 16 channels of ASK demodulation DSP. The embedded precise low-side current sensing, generic 10 bit ADC and DAC enable high performance FOD and Q-factor detection.

It supports over-voltage, over-current, under-voltage protection and over-temperature protection for safe operation.MT5815 integrates separated high frequency and low frequency oscillators for low power and low-cost application. The internal high frequency PLL with support of external crystal is designed for high accuracy clock and PWM signal generation. The high flexible I/O configuration enables multi-coil application with optimized standalone MOSFET drivers (MT5603). MT5815 is able to provide flexible dead time control and phase shift generation to improve EMI performance.

MT5815 supports multi-protocol power adaptor interface detection and control with support of QC 2.0/3.0, USB PD, SCP, FCP, etc.

The chip integrates an ARM Cortex M0 processor with 64KB e-Flash memory and various serial interfaces (I2C, UART, GPIO's, etc.), offering powerful processing capabilities and code space. The reference application is available with standard firmware. Customers can easily develop the customized features with the support of library (released separately).

4. TYPICAL APPLICATION CIRCUIT

4.1. Single Coil Application

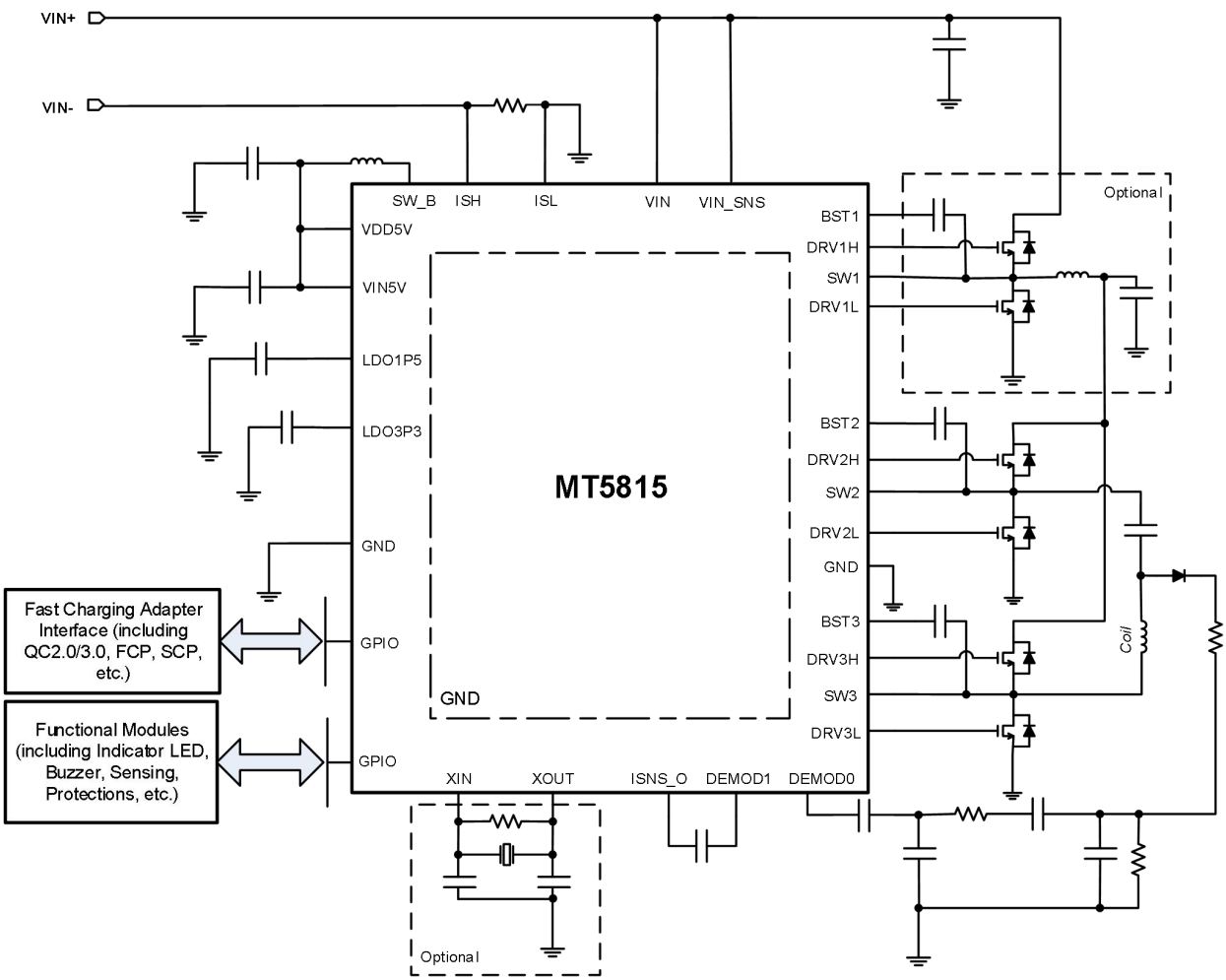
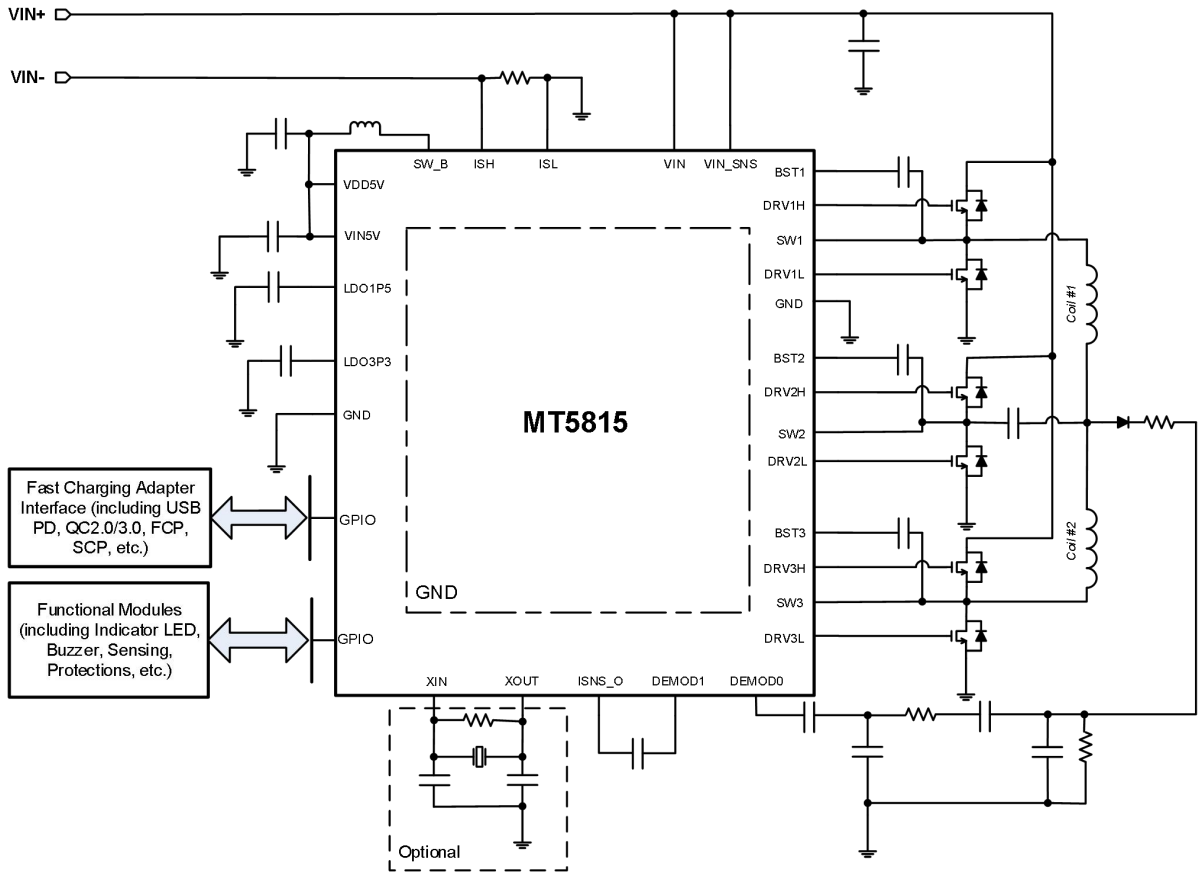


Figure 1 Typical Application Circuit: Single Coil Application

4.2. Two Coils Application



Typical Application Circuit: Two Coils Application