

# bqTESLA Transmitter bq500212A Design

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Wireless Power Transmitter Products

The bq500212A is a 5V input single coil wireless power transmitter. The designer has several options regarding the design which we will cover in this presentation.

The bq500212A eliminates the MSP430 used in previous designs to manage low power sleep mode. To reduce power during Standby, no RX on charging pad or charge complete 3.3V is removed from the bq500212A. The function is replaced with two RC timing circuits:

- SNOOZE circuit—OFF time of 400mS, normal Stand-By Time
- SLEEP circuit —OFF time of 4 Sec, used for Charge Complete

New Design used with bq500212A will only use Digital Ping. Digital Ping is a 75mS pulse that will power RX and gives it an opportunity to respond. Ping is sent at regular intervals based RC time constant no MSP430 used.

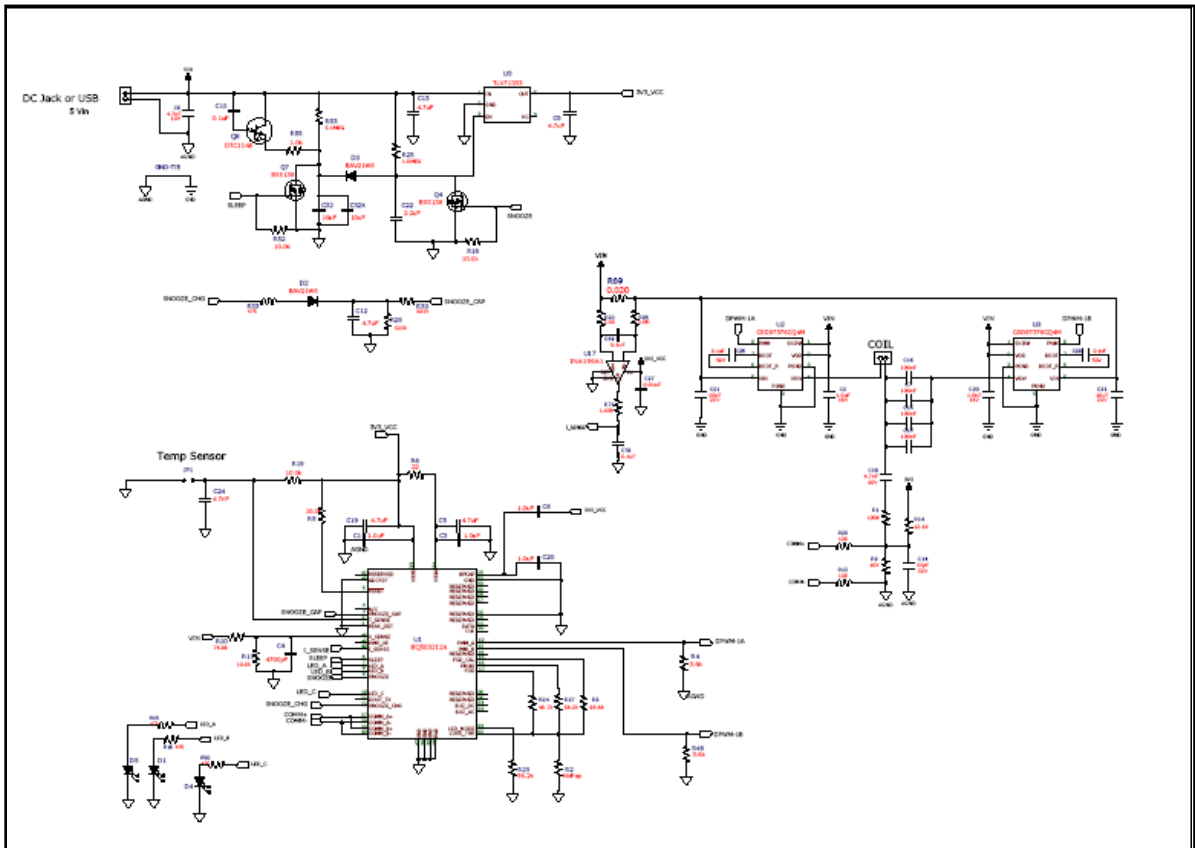


Figure 1. bq500212A Application Schematic

## Power Section:

H-bridge power section can be an integrated solution with drivers and MOSFETs in one package. This is used on the Evaluation Module with CSD97376. A discrete drive and MOSFET are also an option, this design is used on the bq500211A Evaluation Module. To further reduce cost a discrete driver circuit can be used to drive the H-bridge MOSFETs. The design from the bq500211A EVM can be used, details of this circuit can be found in the EVM User’s Guide.

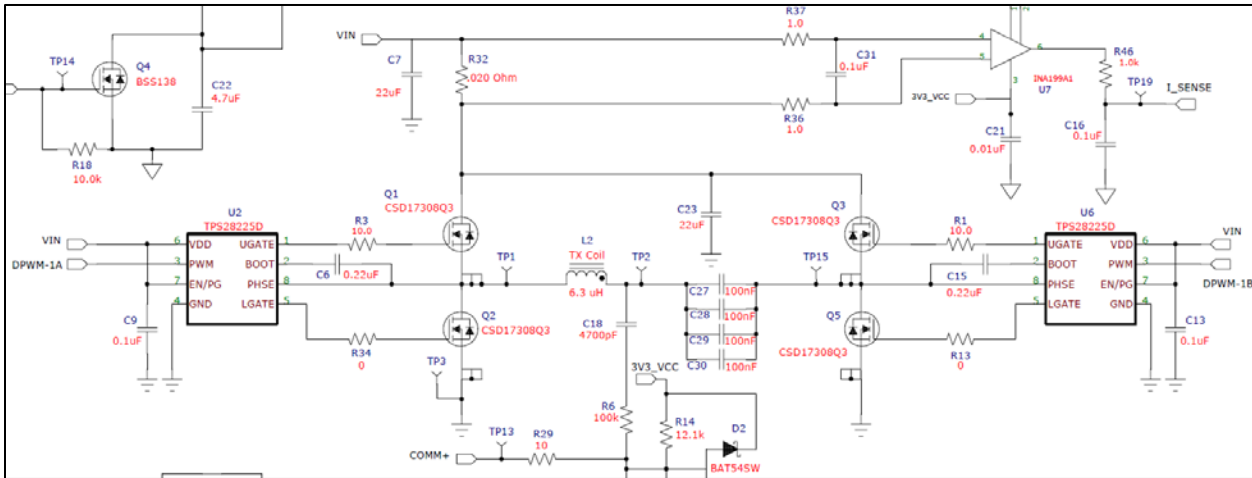


Figure 2. Power Section with Driver /MOSFET from bq500211A EVM

## Non-Qi:

Qi certification involves testing to WPC standard to meet the requirements. If Qi certification is not required the I-sense circuit can be removed, INA199A1. The I-Sense input should be grounded. FOD, PMOD and FOD\_CAL should be open, do not install associated resistors.

## SNOOZE RC time:

The RC time constant for Snooze can be change to increase detection time, shorter RC time. For lower standby power the RC time can be increased, longer off time. For Qi certification the detection time should be 500mS. Designer should evaluate the trade-off between the two.

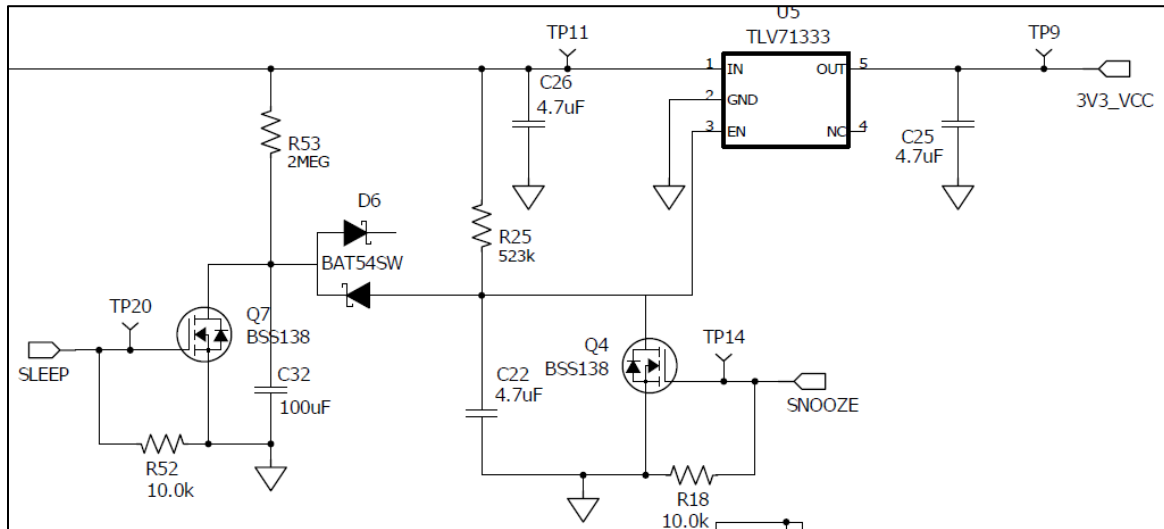


Figure 3. Sleep and Snooze Circuit

### Comm Sample Circuit:

The voltage divider circuit used to produce Comm + sample signal is used to sample the coil voltage. This voltage will have communication packets from the receiver. Values in the divider network should NOT be changed.

### I-Sense:

For Qi certification units very accurate measurement of the current to power section is required. Circuit has a current to voltage translation of 1V to 1A. Care should be taken that this circuit is well laid out with high quality parts.

### PMOD / FOD / FOD-Cal:

For Qi certification Foreign Object Detection (FOD) is required. R\_FOD sets this threshold. A calibration routine is required to set this threshold. If not required, Non-QI the resistor can be omitted. Part of the FOD setting is FOD -Cal which sets the slope of the loss curve. If not required, Non-QI the resistor can be omitted. For WPC 1.0 devices Parasitic Metal Object Detection (PMOD) can be used, this function is similar to FOD but is optional. If not required omit resistor.

THREE resistors are used to set three values:

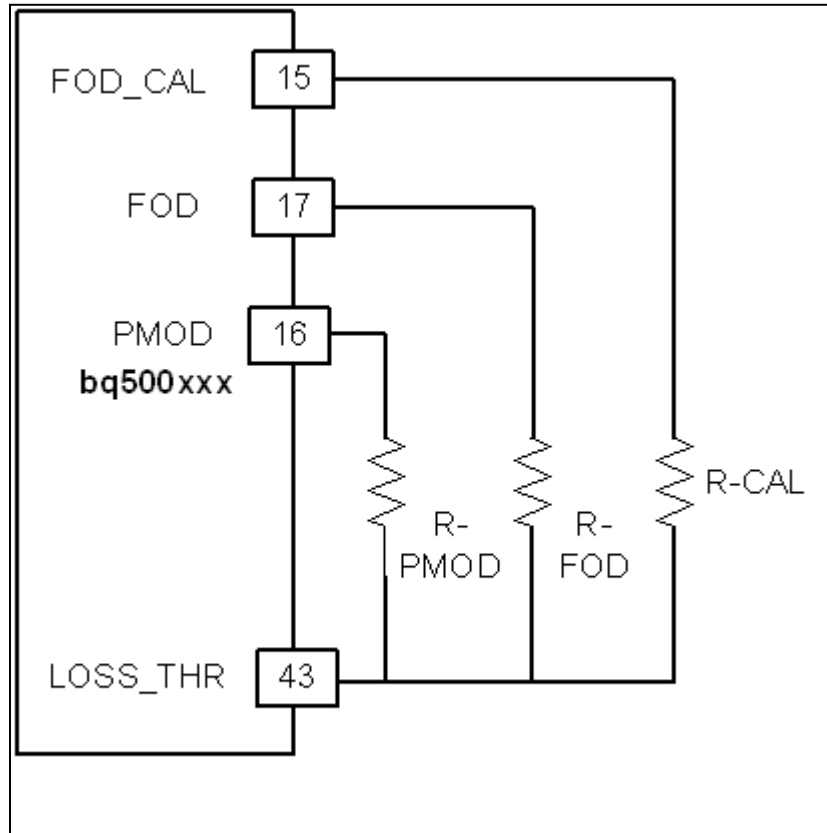
- R\_FOD between pin17 and pin 43 sets FOD
- R\_PMOD between Pin16 and pin 43 sets FOD
- R\_CAL between pin15 and pin 43 sets FOD\_CAL.

Omitting R\_PMOD will disable the PMOD function.

Omitting R\_FOD will disable the FOD function.

Omitting R\_CAL will result in the default FOD\_CAL setting which MAY not result in compliance FOD algorithm for a give system.

Single resistor R-LOSS configuration, Pin 43 to GND for combined THRESHOLD for FOD/PMOD is NOT RECOMMENDED.



**Figure 4. Resistor Configuration for FOD / PMOD / FOD\_CAL**

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