

## 5W Qi® + PMA Dual-Mode Wireless Power Transmitter EVM

### DESCRIPTION

The TSDMTX Evaluation Board is a complete, self-contained system to measure the performance and operating characteristics of the wireless power transmitter reference design. By placing a WPC Qi® compliant receiver on the transmitter coil, the EVM implements a 5W Qi® wireless charging system. By placing a PMA compliant receiver on the transmitter coil, the EVM implements a 5W PMA wireless charging system. The EVM will automatically adjust the charging power, based on the feedback from the receiver.

The TSDMTX EVM contains a custom controller for managing the Qi® or PMA protocol and charging functions. The firmware in the non-volatile memory of the microcontroller can be modified to add user-defined functionality for a specific customer application.

The firmware on the TSDMTX EVM can be updated via the micro-USB interface on the board. Please contact Triune Systems for details.

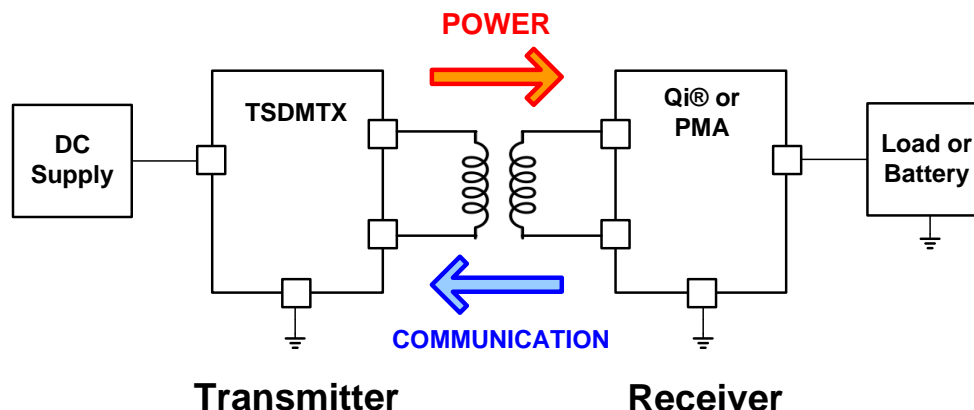
### FEATURES

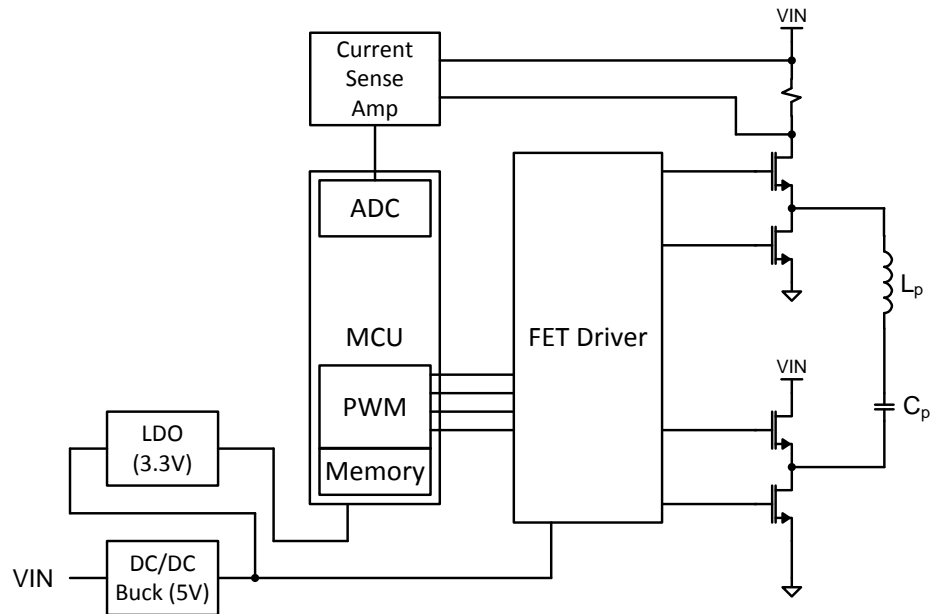
- Self-contained WPC 5W Qi® compliant wireless transmitter
- Self-contained PMA 5W Qi® compliant wireless transmitter
- True dual-mode operation automatically determines correct wireless standard of the receiver
- Requires a 19V @ 1A DC input supply
- WPC 1.1 foreign object detection (FOD)
- LED indicators for power on, charging and error conditions

### APPLICATIONS

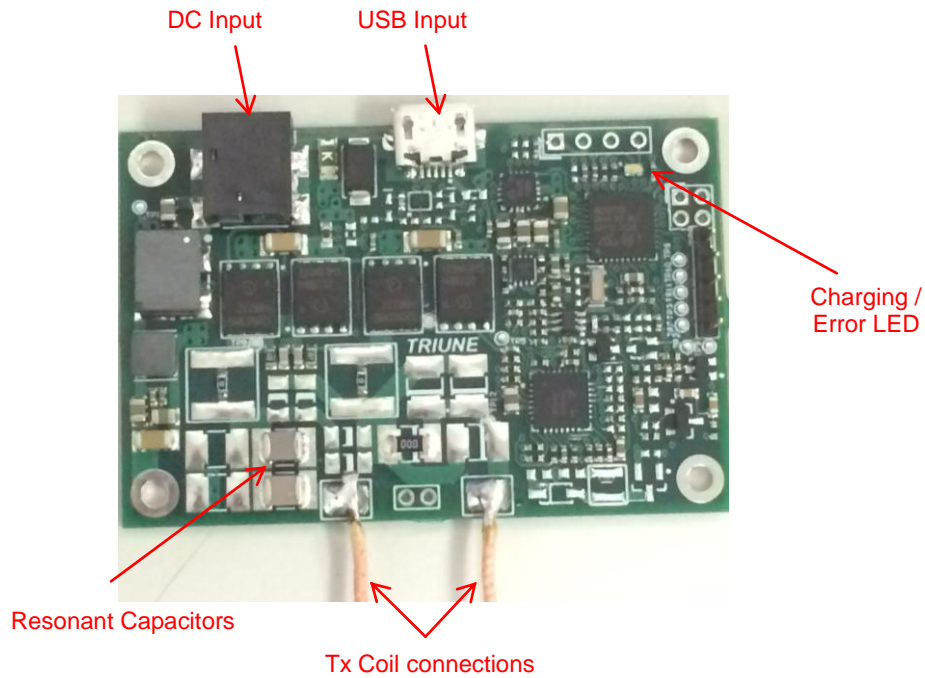
- Qi® and PMA compliant or non-compliant wireless charging
  - Cell Phones and Smartphones
  - Tablets and eReaders
  - MP3 Players
  - GPS Devices
  - Digital Cameras
  - Lighting
  - Toys

### TYPICAL APPLICATION



**BLOCK DIAGRAM**

## PCB CONNECTIONS



Connection	Description
DC Input	19V DC input supply
USB Input	Used for updating the firmware
Tx Coil	Transmitter coil connection
Charging / Error LED	Indicates charging (green flashing), end-of-charge (green solid), foreign object detect (red flashing), or error condition (red solid) per Qi® specification

\* The EVM is set in the factory for optimum performance using a transmitter coil with inductance of 24uH at 100kHz, such as the TDK WT505090-20K2-A10-G or WT525225-20K2-A1-G. Other transmitter coils can be used provided the EVM is tuned to resonance at 100kHz by replacing the series resonant capacitors (shown in diagram). The resonant capacitors should be low-ESR type to prevent excessive PCB heating at high currents. It is recommended you contact Triune Systems before modifying the EVM.

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## WPC Qi® OPERATION

When a WPC Qi® compliant receiver is placed on the transmitter coil, the EVM implements a 5W Qi® wireless charging system. The EVM will automatically adjust the charging power, based on the feedback from the receiver. Depending on the type of receiver coil, you may need to place a 1-2mm spacer on the Tx Coil (plastic or similar non-metallic); the system may operate more reliably with a spacer between the transmitter and receiver coils. Charging LED will illuminate green for ~2 seconds, and then start flashing green; this indicates charging is taking place. If the receiver coil moves too far in relation to the transmitter coil, the Error LED may illuminate solid red, indicating an error condition. If this (or any other error condition) occurs, remove the receiver from the transmitter, wait for the Charging LED and/or Error LED to turn off, and then replace the receiver on the transmitter.

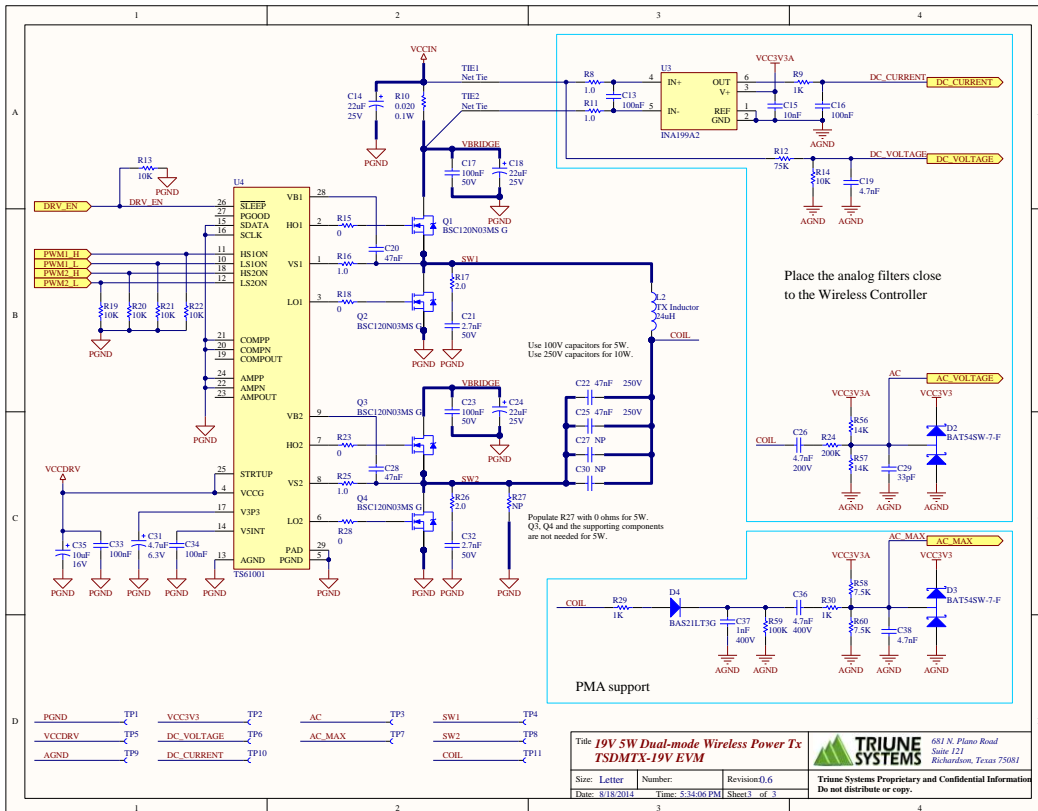
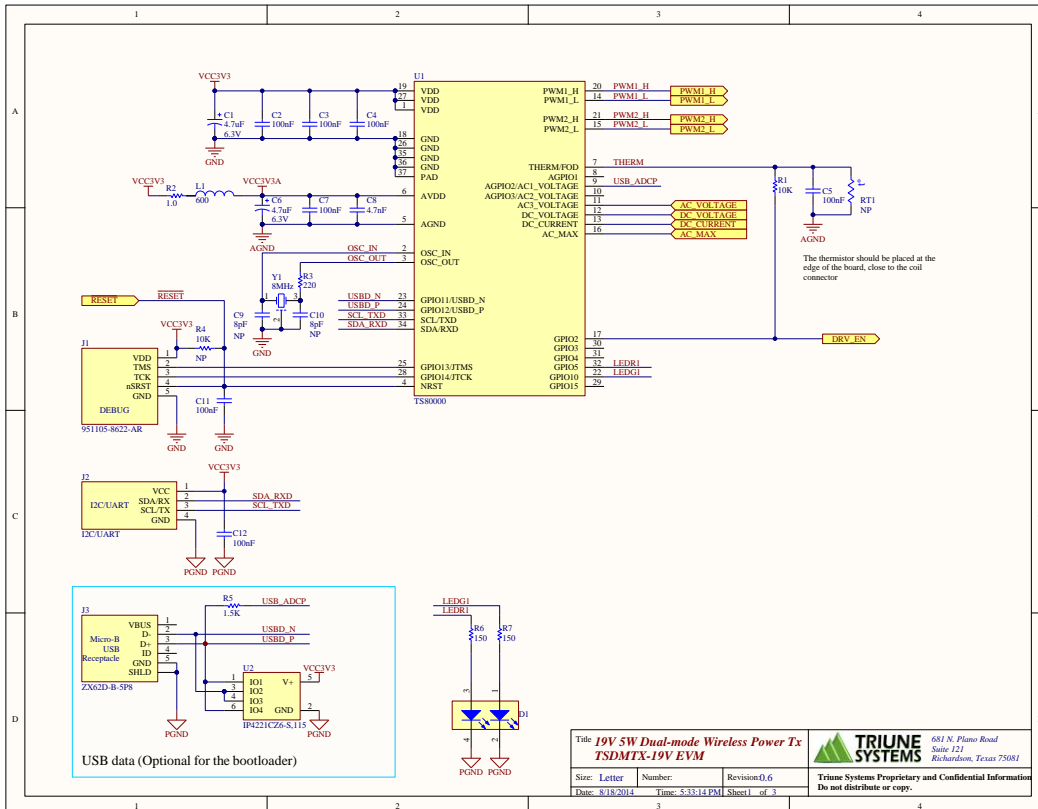
The TSDMTX when in Qi® operation contains an algorithm for sensing the presence of additional metal objects placed on the Tx (foreign object detection). When a metal object is placed on/near the Tx coil during operation, and if the metal object absorbs too much energy from the system, the Tx will shut down and the Error LED will flash red.

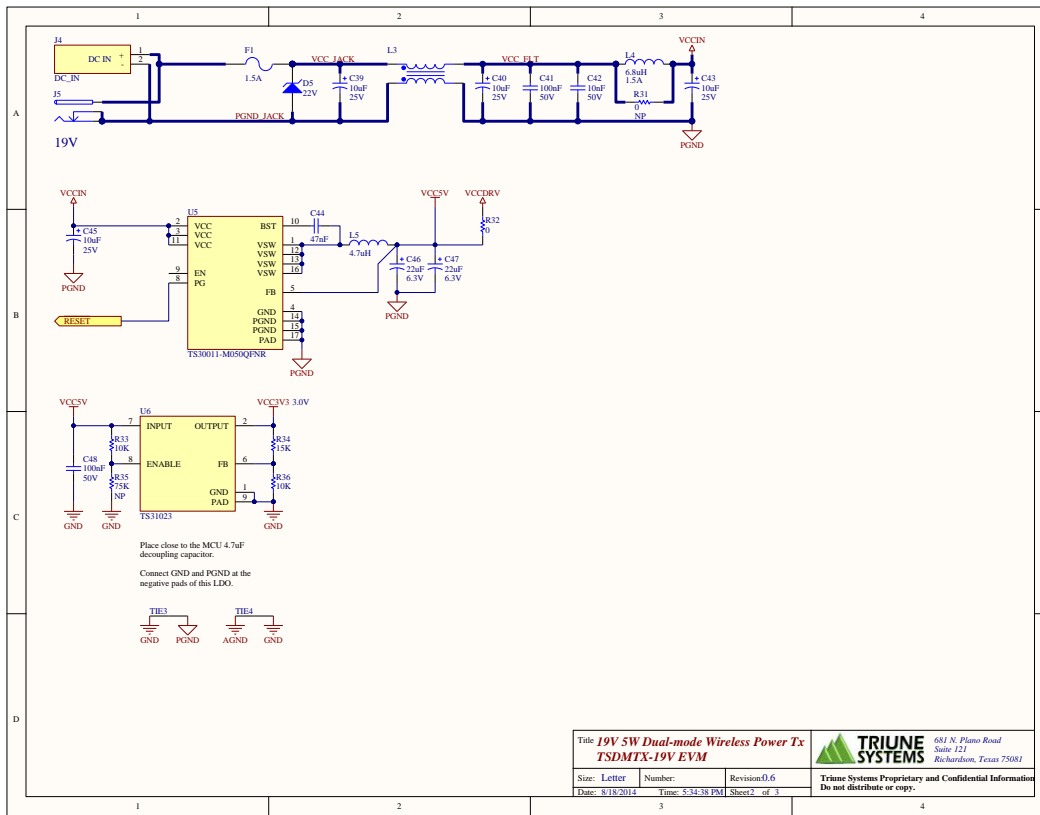
## PMA OPERATION

When a PMA compliant receiver is placed on the transmitter coil, the EVM implements a 5W PMA wireless charging system. The EVM will automatically adjust the charging power, based on the feedback from the receiver. Depending on the type of receiver coil, you may need to place a 1-2mm spacer on the Tx Coil (plastic or similar non-metallic); the system may operate more reliably with a spacer between the transmitter and receiver coils. Charging LED will illuminate green for ~2 seconds, and then start flashing green; this indicates charging is taking place. If the receiver coil moves too far in relation to the transmitter coil, the Error LED may illuminate solid red, indicating an error condition. If this (or any other error condition) occurs, remove the receiver from the transmitter, wait for the Charging LED and/or Error LED to turn off, and then replace the receiver on the transmitter.

This default behavior can be changed through firmware modifications.

## SCHEMATICS





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