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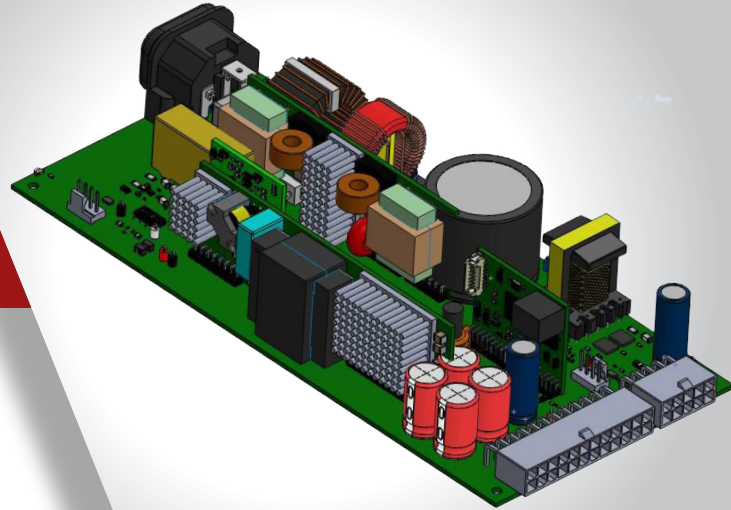


# High-Efficiency **MODULE** Development Board

## TD-DEV-500-PFC Technical Specification

### FEATURES

- Low profile 1U, 500W PFC Development Board
- High-Efficiency Diode
- High-Efficiency PFC Module
- Fully Integrated with CPU control (optional)



### PRODUCT OVERVIEW

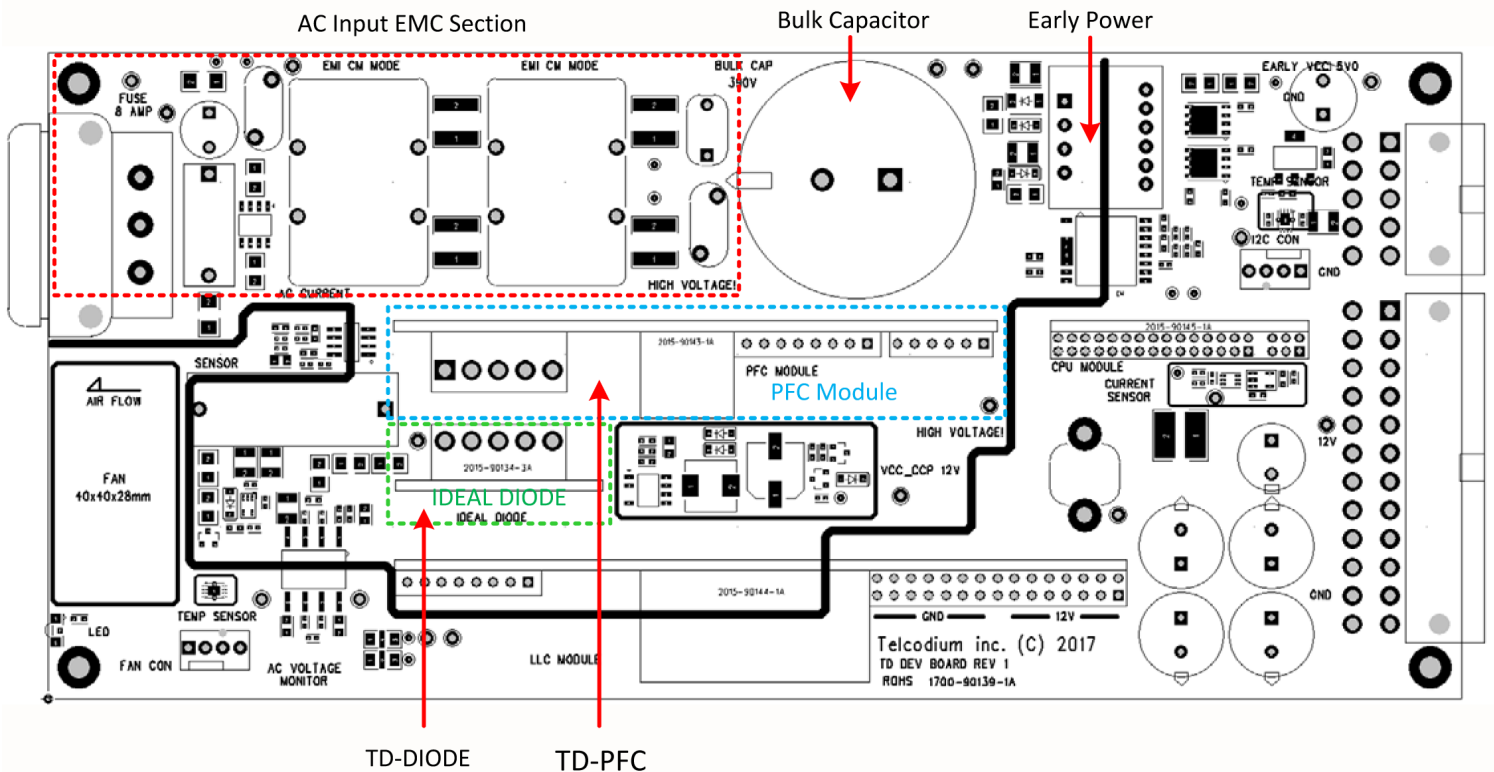
The Telcodium High-Efficiency Module Development Board is used to test and help in the development of High-Efficiency PFC designs. This development board can be used to test the TD-DIODE-1000 and TD-PFC-500 modules included. It can also be used to help design your own PFC sections and integrate it in your products as the schematics, the gerber files and the BOM of the development board are included.

### APPLICATIONS

- PFC design using High-Efficiency Modules from Telcodium -
- High-Efficiency equipment design
- Ready for production PFC design
- Power range from 100W - 500W

## OVERVIEW

Figure 1.



## SECTION DESCRIPTION

- AC Input EMC Section : AC inlet connector type 3 emi filter
- Ideal diode : TD-DIODE\_1000
- PFC Module : TD-PFC-500
- CPU Module (Optional) : TD-CPU-192 (Optional)
- Early Power 5.0V : External 5.0V at 2.5A, DC output voltage
- Bulk Capacitor : 330uf, 450V bulk capacitor for 500W, design

Figure 2.

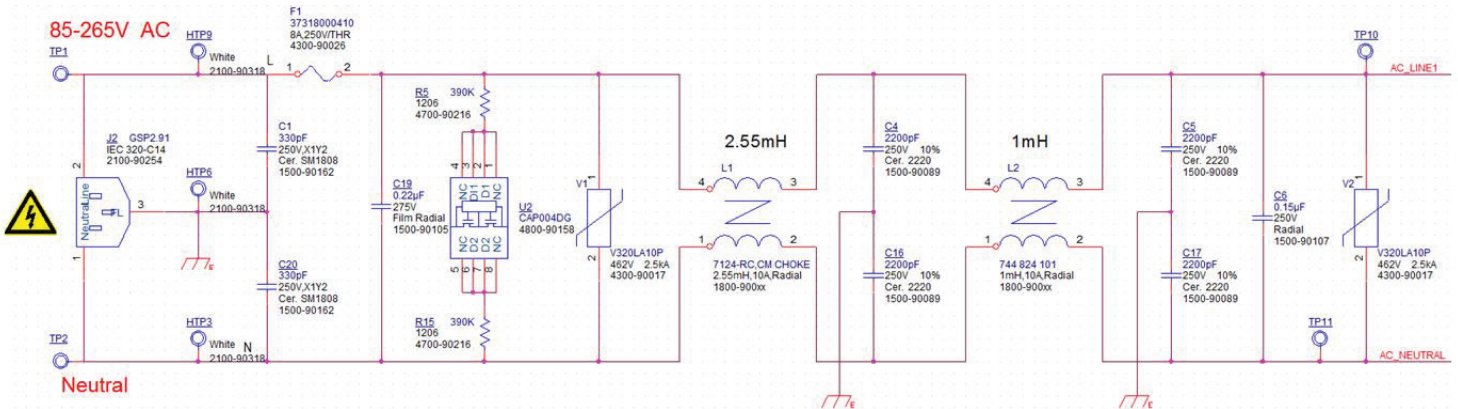


Figure 3.

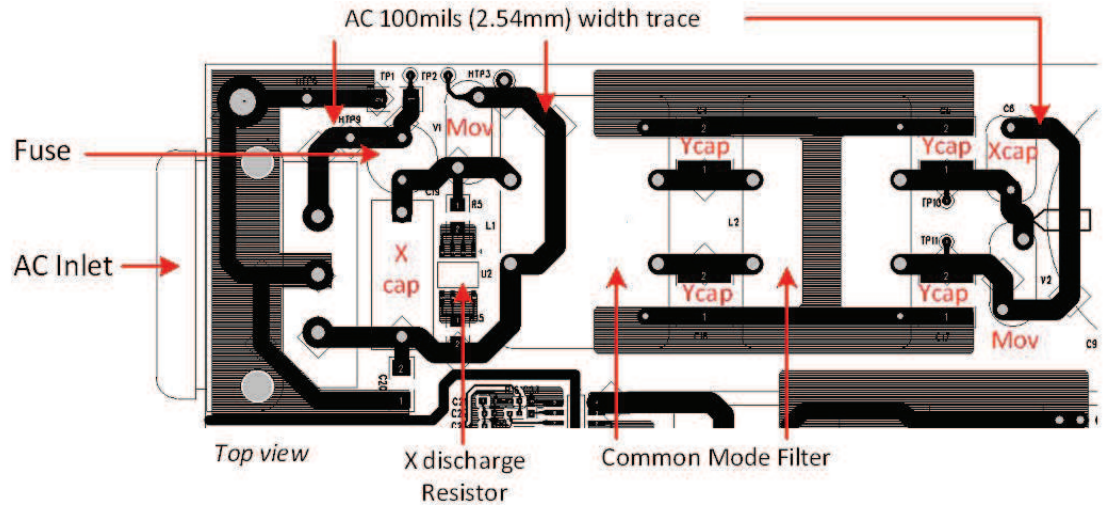


Figure 4.

### AC INPUT DESCRIPTION

- Fuse for 500W design min 8A,
- Trace width on AC line, 100mils, (2.54mm), plating 1.5oz (53µm) for the top and bottom
- Trace spacing for High voltage trace 125mils (3.175mm)
- X Cap and Y Cap capacitors need to be used
- Inductor needs to have a min current rating of 8A,

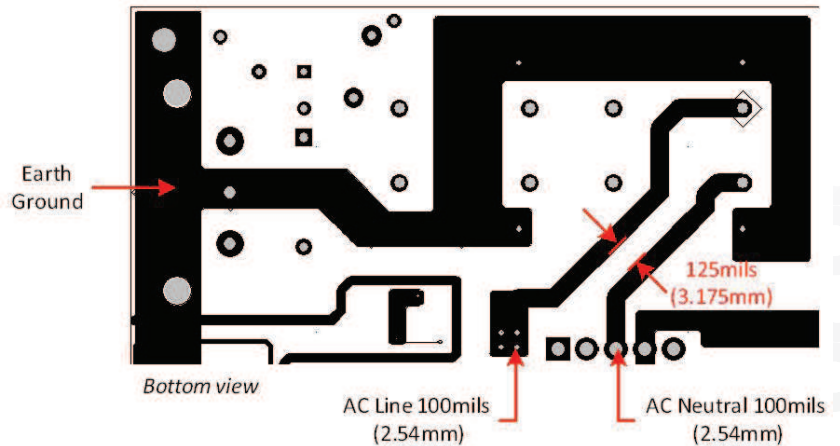


Figure 5.

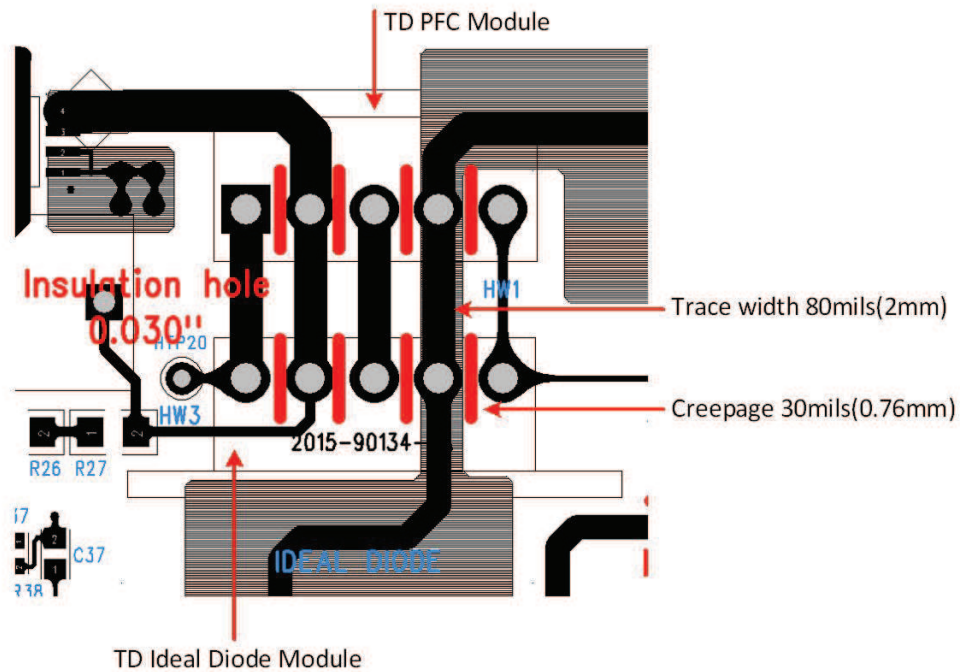
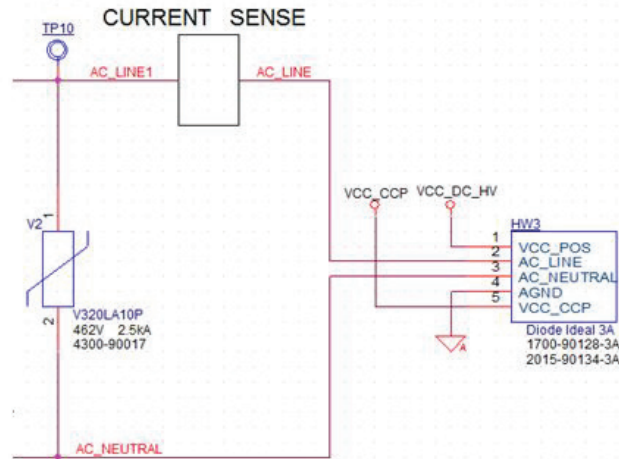


Figure 6.

## TD IDEAL DIODE MODULE

- AC\_LINE from EMI filter to Pin 2
- AC\_NEUTRAL from EMI filter to Pin 3
- VCC\_DC\_HV rectified DC output
- AGND ground reference for High voltage section
- VCC\_CCP, from local DC-DC module (see figure 11)
- Direct connection between TD PFC Module and TD Ideal Diode
- Add creepage of 30mils(0.76mm), cnc cutout between the pad for proper insulation
- AC\_LINE, AC\_NEUTRAL, VCC\_DC\_HV, AGND trace width 80mils (2mm)
- VCC\_CCP, from PFC module trace width min 15mils (0.038mm) (see figure 11)

Figure 7.

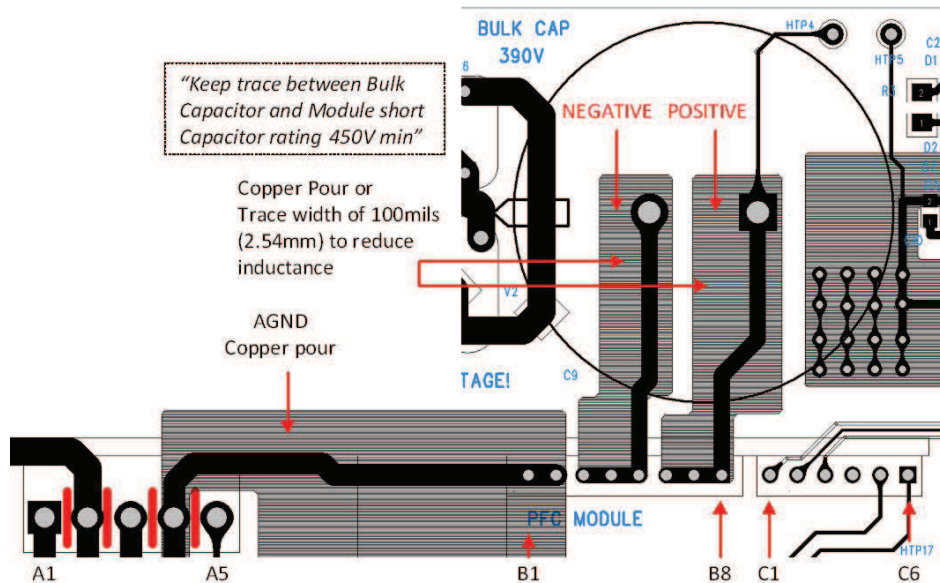
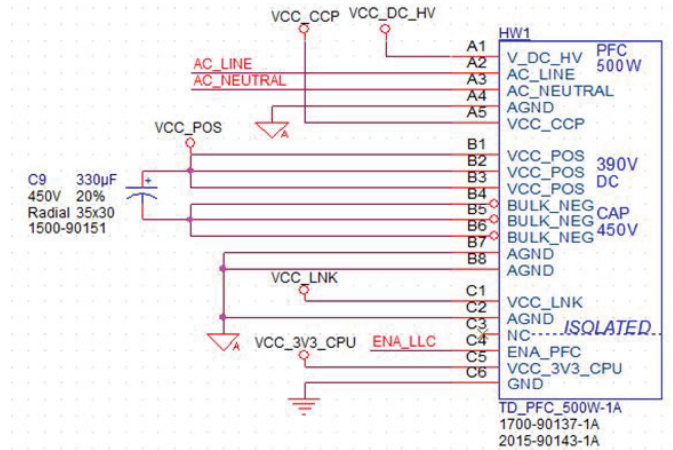


Figure 8.

## TD PFC MODULE

- AC\_LINE from ideal diode Pin A2
- AC\_NEUTRAL from ideal diode to Pin A3
- VCC\_DC\_HV rectified DC input Pin A1
- AGND ground reference for High voltage section A4,B7,B8 and C2
- VCC\_CCP, from local DC-DC module (see figure 11)
- VCC\_POS, 390Vdc output to ideal diode
- Bulk capacitor B1,2,3 and B5,6,7 (see layout)
- VCC\_LNK input (From local DC-DC)
- ENA\_LLC (PFC), same enable for LLC and PFC
- VCC\_3V3\_CPU, local isolated 3.3Vdc
- GND (C6) isolated GND (DO NOT CONNECT TO AGND)
- Minimum bulk Capacitor sized for 20ms hold time at 500W are 330uf, 450V,
- Maximum current at 500W, 390Vdc, 1.28A,
- Keep trace length between TD PFC Module and Bulk Capacitor, short to reduce inductance,
- Keep good clearance between trace Pin C1,2,3 and C4,5,6 (min 100mil), (2.54mm)

Figure 9.

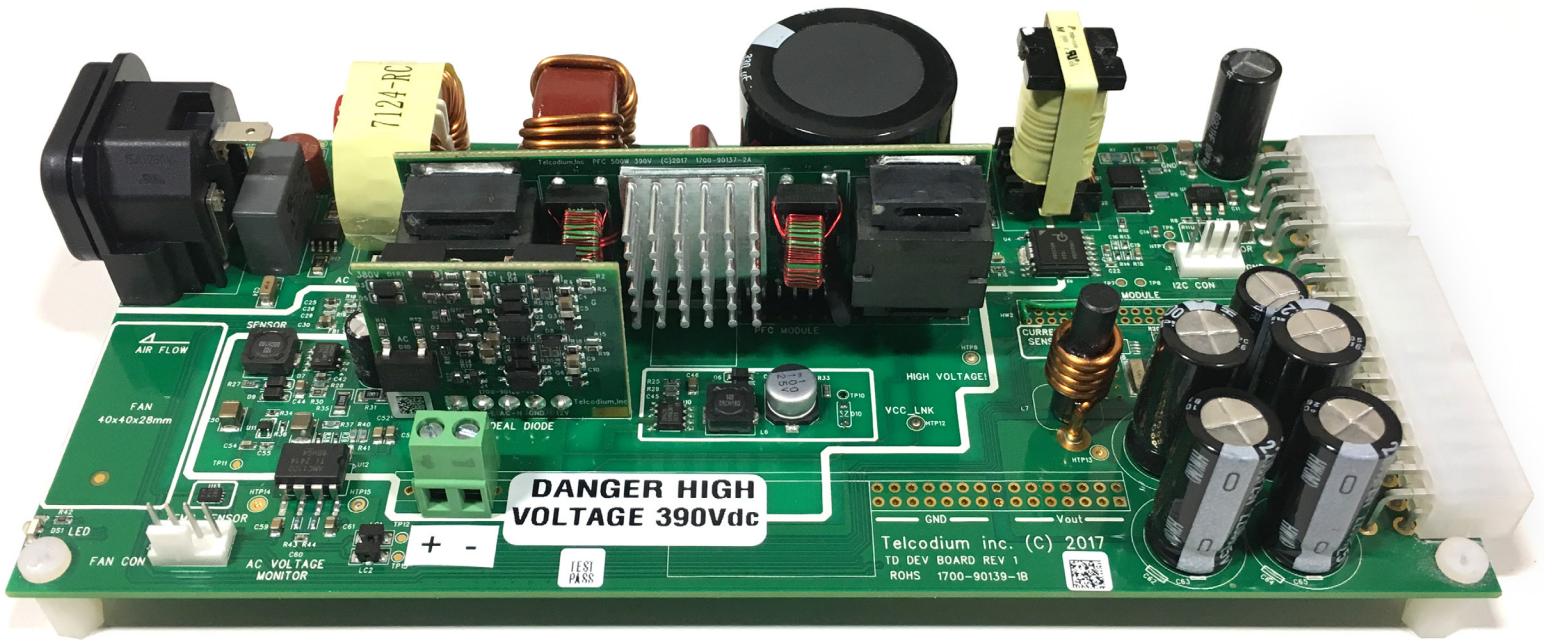


Figure 10.

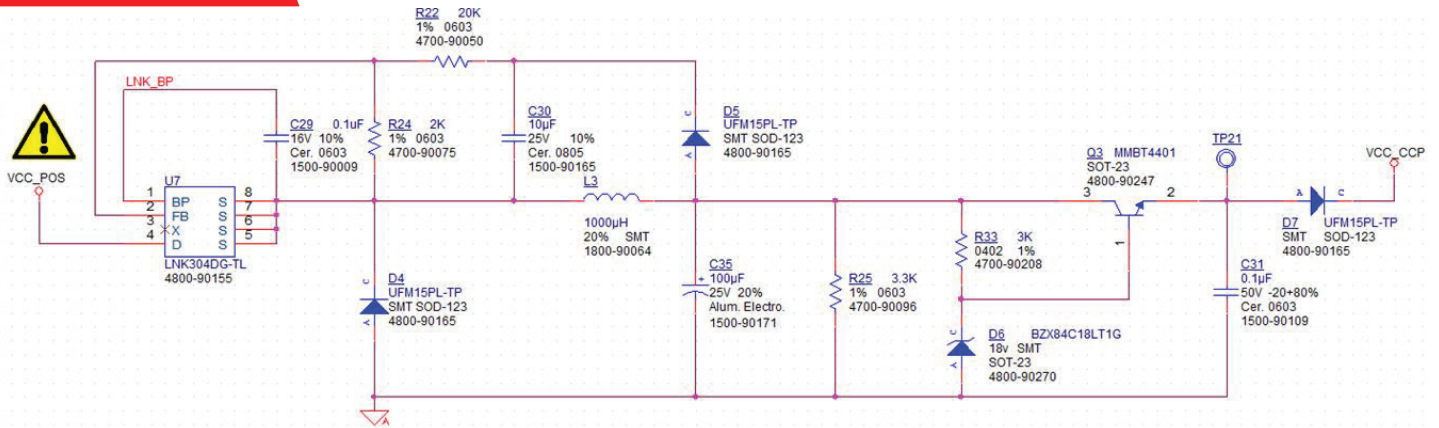
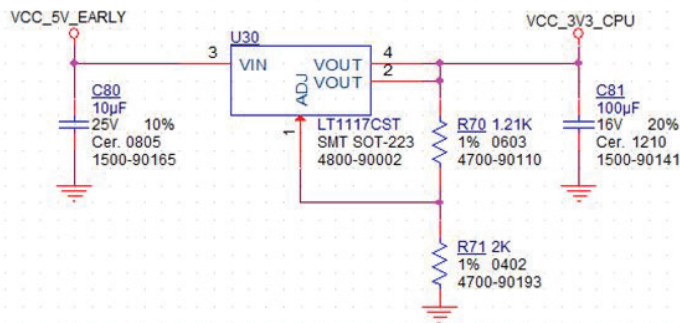
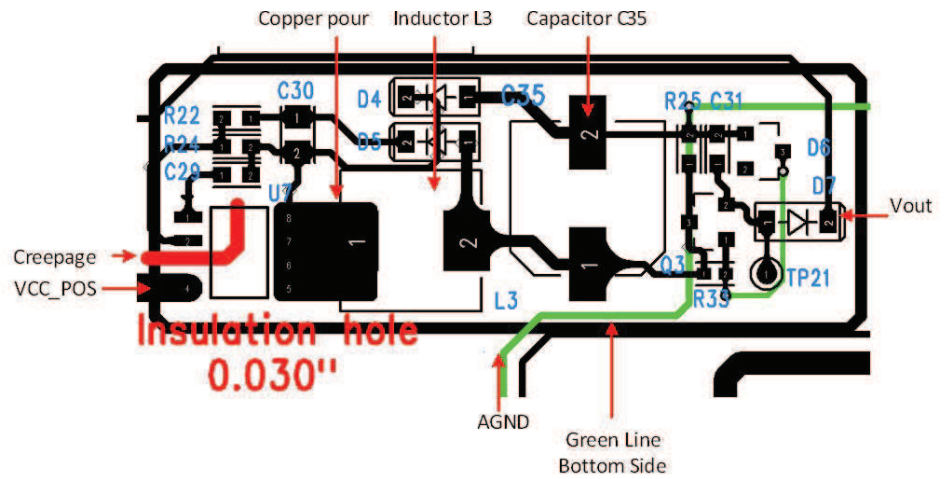


Figure 11.

### LOCAL DC-DC

- Add 30mils (0.76mm) creepage
- Add copper pour to reduce inductance on Pin 5 to 8
- Follow the spacing and parts position to avoid noise



COPPER AREA			THERMAL RESISTANCE (JUNCTION-TO-AMBIENT)
TOPSIDE*	BACKSIDE	BOARD AREA	
2500 Sq. mm	2500 Sq. mm	2500 Sq. mm	45°C/W
1000 Sq. mm	2500 Sq. mm	2500 Sq. mm	45°C/W
225 Sq. mm	2500 Sq. mm	2500 Sq. mm	53°C/W
100 Sq. mm	2500 Sq. mm	2500 Sq. mm	59°C/W
1000 Sq. mm	1000 Sq. mm	1000 Sq. mm	52°C/W
1000 Sq. mm	0	1000 Sq. mm	55°C/W

Figure 13.

- Isolated side 5.0V to 3.3V DC-DC

3 Use enough copper pour to reduce heat and loss for TD CPU 200mA (max) at 3.3V



Figure 13.

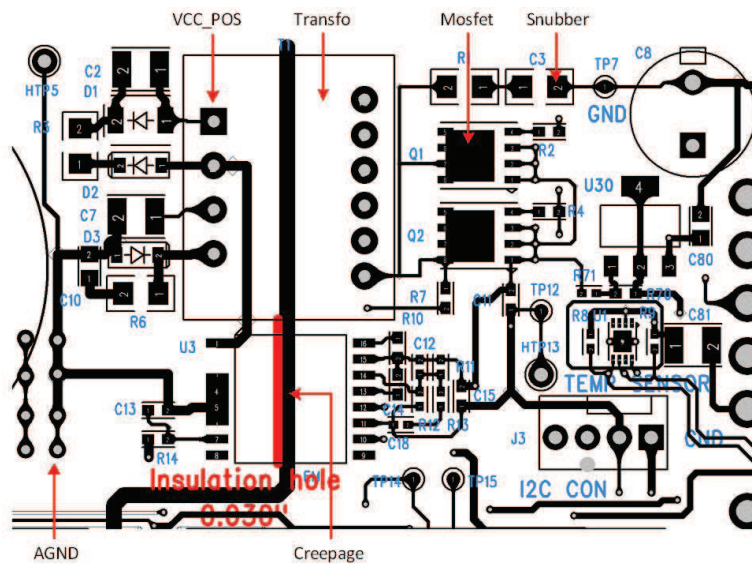
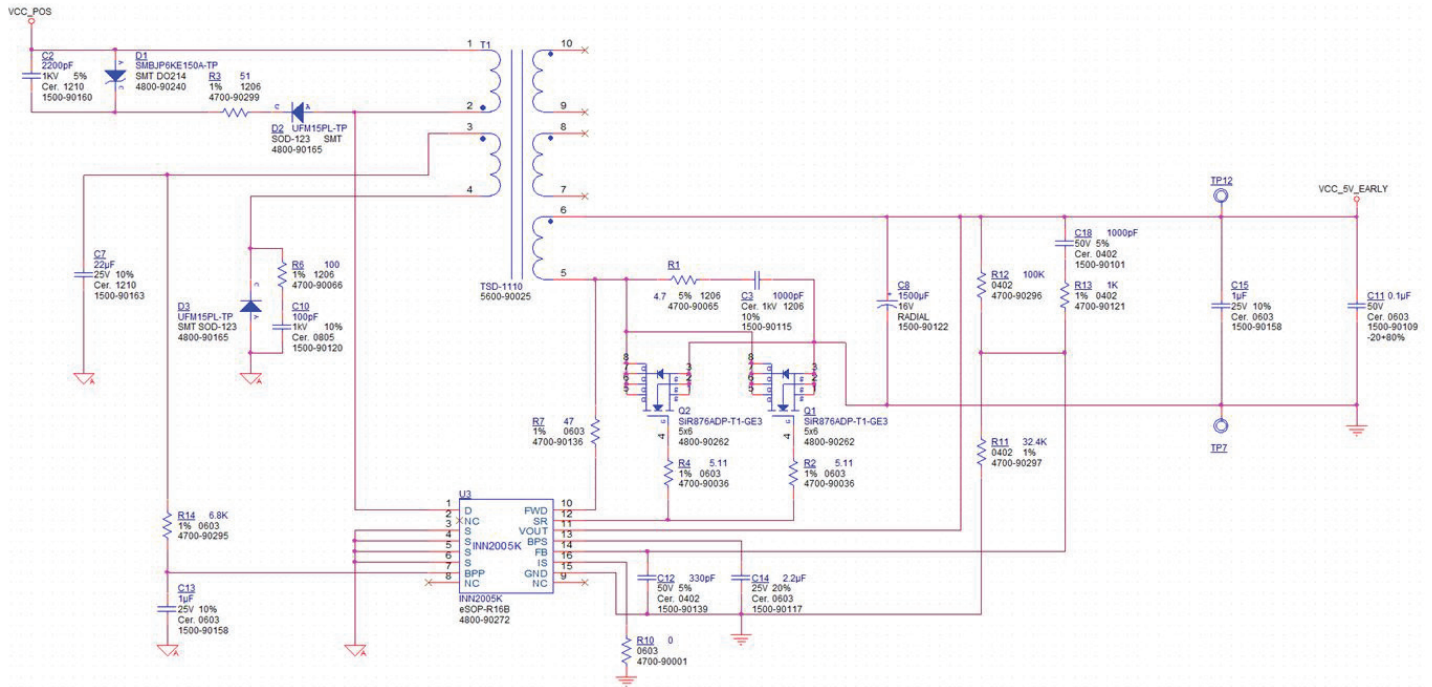


Figure 14.

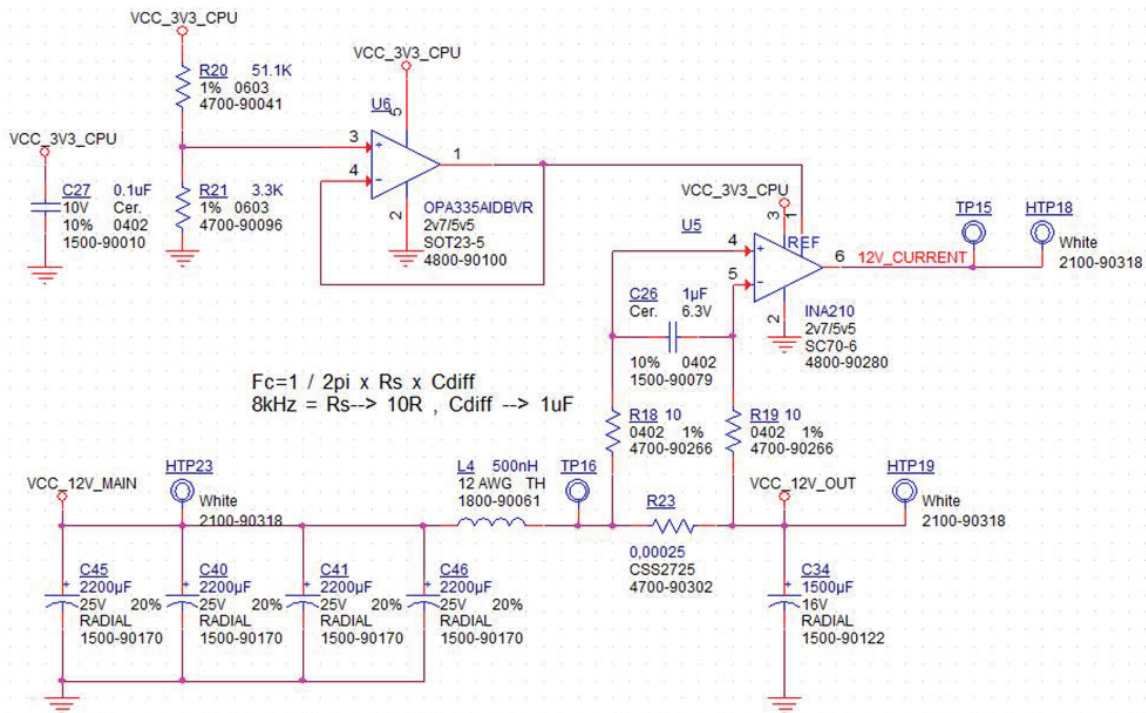
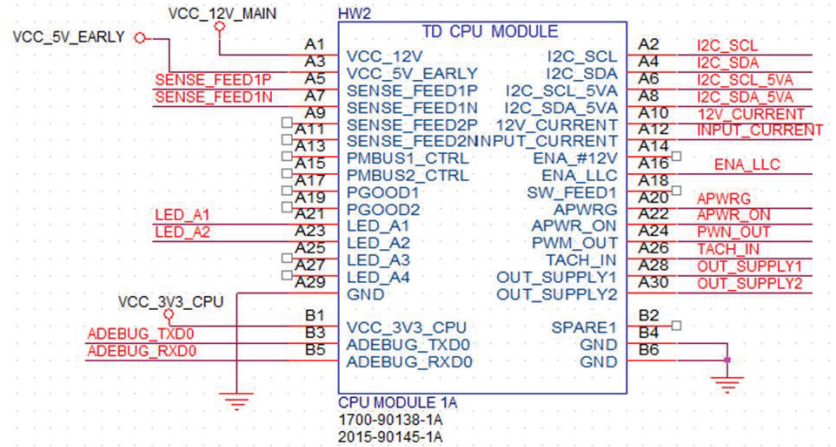
## EARLY POWER 5.0V

3 To avoid any noise issue follow this placement or refer to Power Integration InnoSwitch INN2005K

Figure 15.

## TD CPU MODULE (Optional)

3 Use 10 mils (0.0254mm) min  
for routing signal trace



## PCB SPECIFICATION

- Plating 1.5oz (53um) final "0.5oz (18um)+ 1oz (35um) plating"
- Total copper Thickness 2.1mils (53um)
- TD DEV board, 2 layers
- Thickness: 62 mils
- Material: FR4
- Solder mask: Green
- Silkscreen: White
- Plating: Emersion gold
- Minimal drill size: 10-24
- Trace width minimal: 10mils (0.0254mm) for 1.5 oz plating

## PCB TRACE TEMPERATURE RISE AND CURRENT CAPACITY (For reference)

- 100mils (2.54mm) trace width, 39.6F (22C) Ambient, 200kHz Freq
  - Power dissipation: 0.13W
  - Conductor DC resistance: 0.00361ohms
  - Conductor Current: 6.04A
  - Voltage Drop:0.0218V / 1000mils (25.4mm)
  - Max temperature rise 111F (44C)
- IPC-2152 (no plane)

## POWER SUPPLY DESIGN SERVICES AVAILABLE

If you would prefer us to design your next power supply using Telcodium High-Efficiency modules please contact us: [info@telcodium.com](mailto:info@telcodium.com)

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