High Voltage

Three Phase 3Wire/ 4Wire/ 5Wire Input

Rated Input 110Vrms, 60Hz, 1.2KW

Rated Input 220Vrms, 50Hz, 2.4KW

High Voltage

DC Vout Typical 700V, Max 800V

3.5 Amps DC Output Max at 3Ph 220Vrms Input

2 Amps DC Output Max at 3Ph 110Vrms Input

U_EMCInputFilter
MCU011A_EMCInputFilter.SchDoc

U_PowerStage
MCU011A_PowerStage.SchDoc

U_SensingInductorCurrent
MCU011A_SensingInductorCurrent.SchDoc

U_SensingOutputVoltage
MCU011A_SensingOutputVoltage.SchDoc

U_PWMDrivers
MCU011A_PWMDrivers.SchDoc

U_Controller
MCU011A_Controller.SchDoc

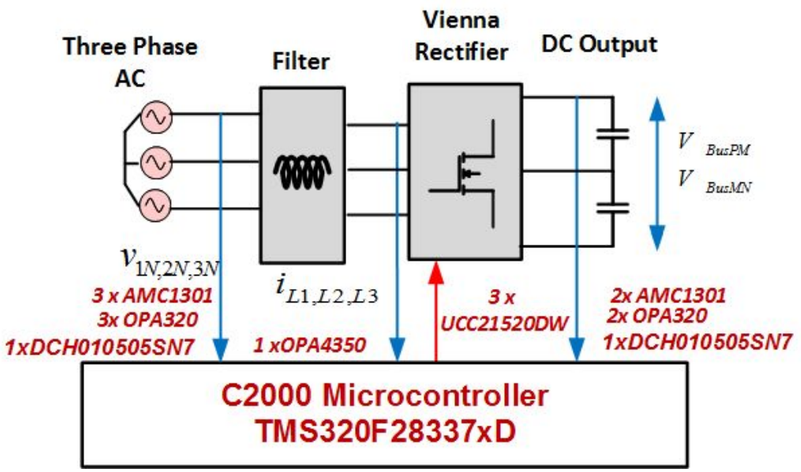
U_SensingInputVoltage
MCU011A_SensingInputVoltage.SchDoc

U_ControllerPower
MCU011A_ControllerPower.SchDoc

U_EVM_Hardware
MCU011A_EVM_Hardware.SchDoc

12V DC , 1Amps

PJ-037AH



Revision History				
Rev	ECN #	Approved Date	Approved by	Notes
E1	N/A	3/8/2016	N/A	First Revision of MCU011
E2	N/A	8/24/2016	N/A	Second Revision of MCU011
A	N/A	5/23/2016	N/A	Release Version MCU011

Orderable: TIEVM-VIENNARECT		Designed for: Public Release	Mod. Date: 12/20/2017
TID #: TIDM-1000		Project Title: C2000 Three Phase PFC (Vienna Rectifier)	
Number: MCU011	Rev: A	Sheet Title: Cover Page	
SVN Rev: Version control disabled		Assembly Variant: 001	Sheet: 1 of 10
Drawn By: Manish Bhardwaj		File: MCU011A_CoverSheet.SchDoc	Size: B
Engineer: Manish Bhardwaj		Contact: http://www.ti.com/support	

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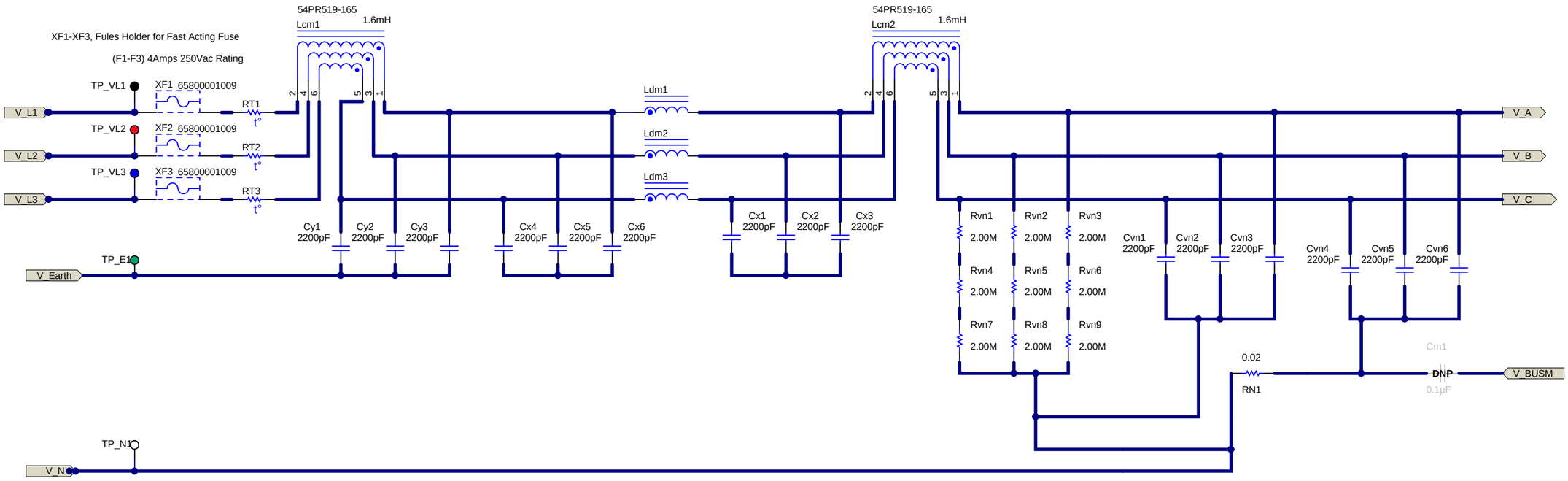

Orderable: TIEVM-VIENNARECT	Designed for: Public Release	Mod. Date: 5/26/2017
TID #: TIDM-1000	Project Title: C2000 Three Phase PFC (Vienna Rectifier)	
Number: MCU011 Rev: A	Sheet Title: EMC Input Filter	
SVN Rev: Version control disabled	Assembly Variant: 001	Sheet: 2 of 10
Drawn By:	File: MCU011A_EMCInputFilter.SchDoc	Size: B
Engineer: Manish Bhardwaj	Contact: http://www.ti.com/support	

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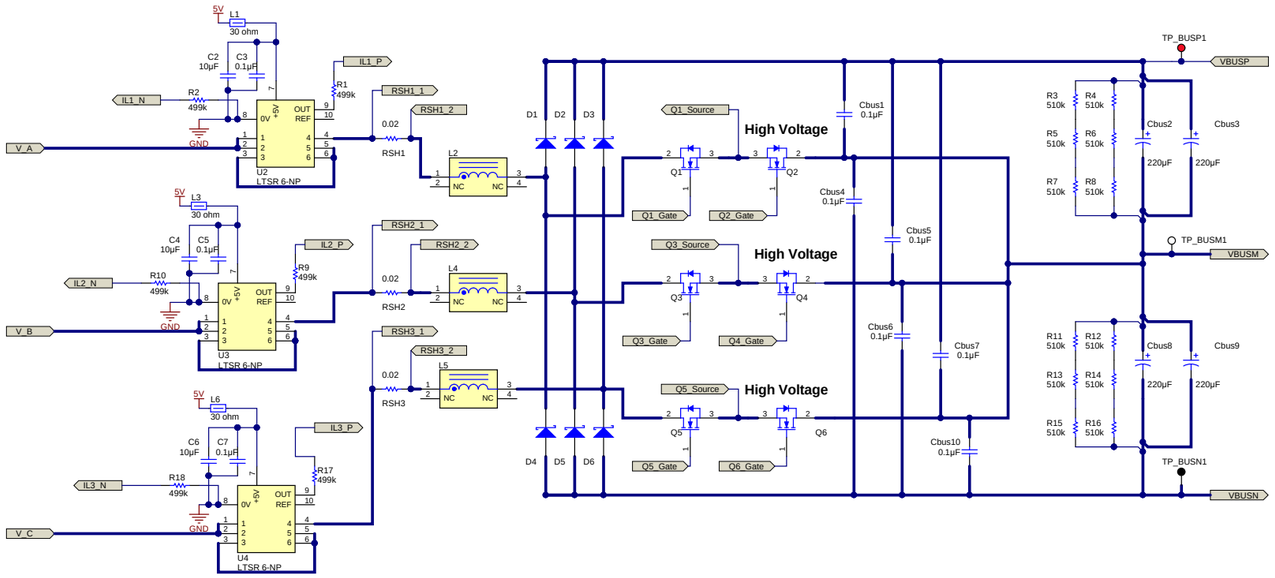
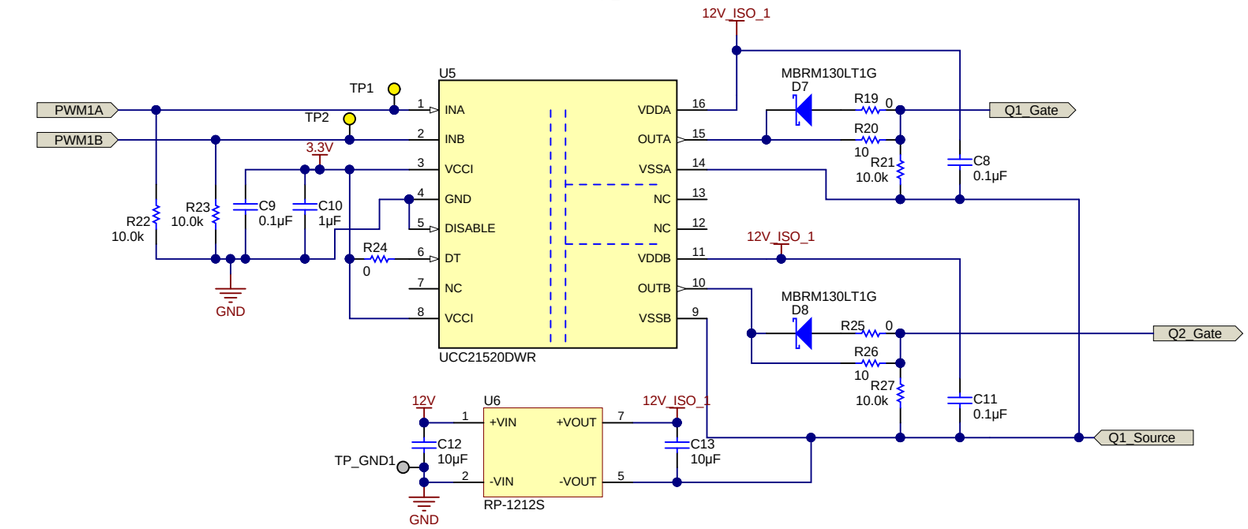
All the nets higlighted are high current carrying and high voltage carrying, appropriate clearance and width is needed

High Voltage

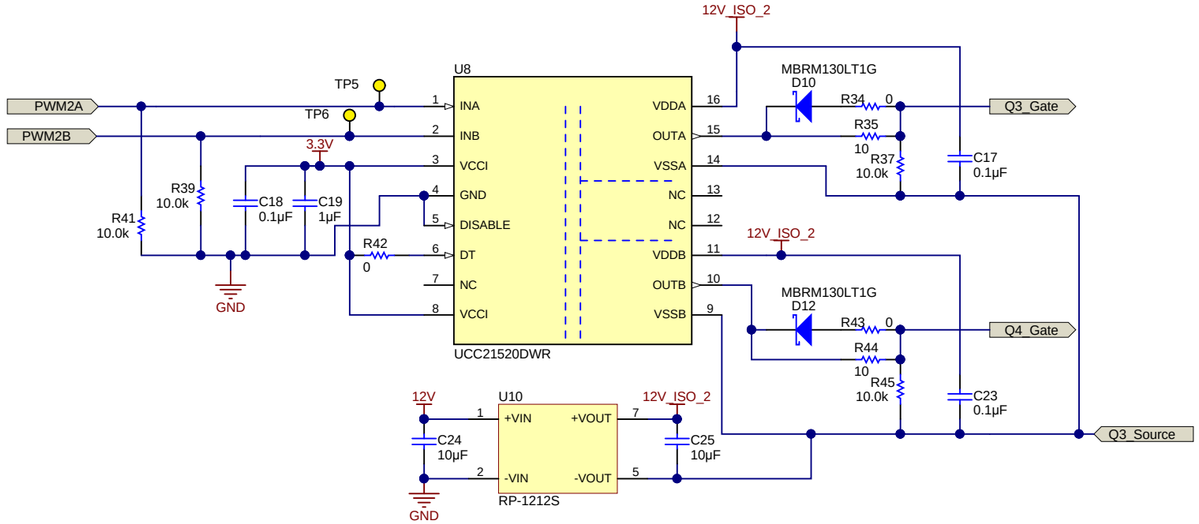


Orderable: TIEVM-VIENNARECT		Designed for: Public Release	Mod. Date: 5/26/2017
TID #: TIDM-1000		Project Title: C2000 Three Phase PFC (Vienna Rectifier)	
Number: MCU011	Rev: A	Sheet Title: Vienna Rectifier Power Stage	
SVN Rev: Version control disabled		Assembly Variant: 001	Sheet: 3 of 10
Drawn By: Manish Bhardwaj		File: MCU011A_PowerStage.SchDoc	Size: C
Engineer: Manish Bhardwaj		Contact: http://www.ti.com/support	http://www.ti.com

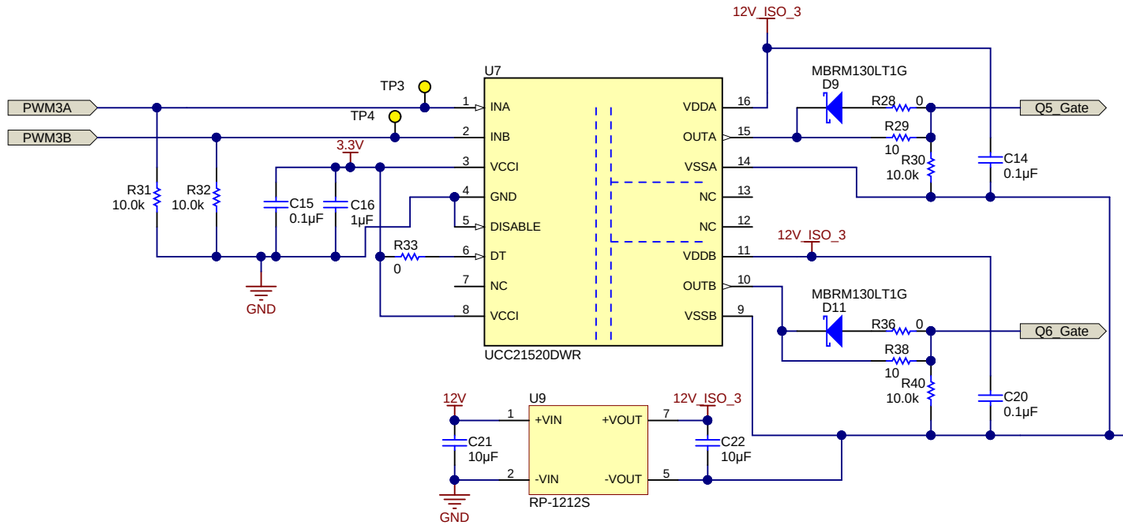
Place U1 Close to Q1 and Q2, and minimize distance between Q1_Gate and U1-OUTA, Q2-Gate and U1-OUTB , VSS1 &VSS2 and Q1-Source



Place U2 Close to Q3 and Q4, and minimize distance between Q3_Gate and U2-OUTA, Q4-Gate and U2-OUTB , VSS1 &VSS2 and Q3-Source



High Voltage



Place U3 Close to Q5 and Q6, and minimize distance between Q5_Gate and U3-OUTA, Q6-Gate and U3-OUTB , VSS1 &VSS2 and Q5-Source

Orderable: TIEVM-VIENNARECT		Designed for: Public Release	Mod. Date: 12/20/2017
TID #: TIDM-1000		Project Title: C2000 Three Phase PFC (Vienna Rectifier)	
Number: MCU011	Rev: A	Sheet Title: PWM Gate Drivers	
SVN Rev: Version control disabled		Assembly Variant: 001	Sheet: 4 of 10
Drawn By: Manish Bhardwaj		File: MCU011A_PWMDrivers.SchDoc	Size: B
Engineer: Manish Bhardwaj		Contact: http://www.ti.com/support	

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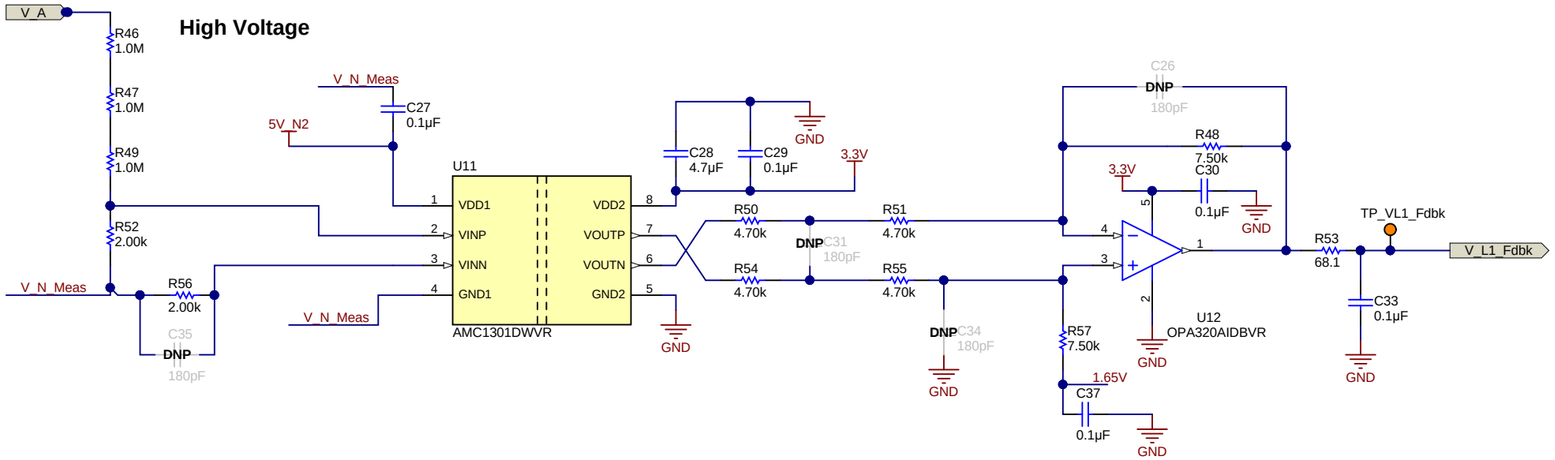
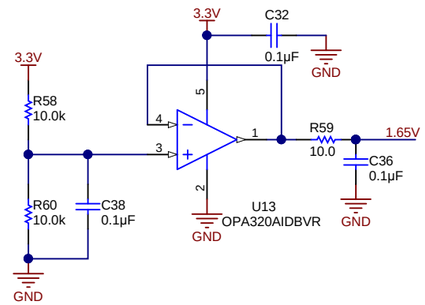
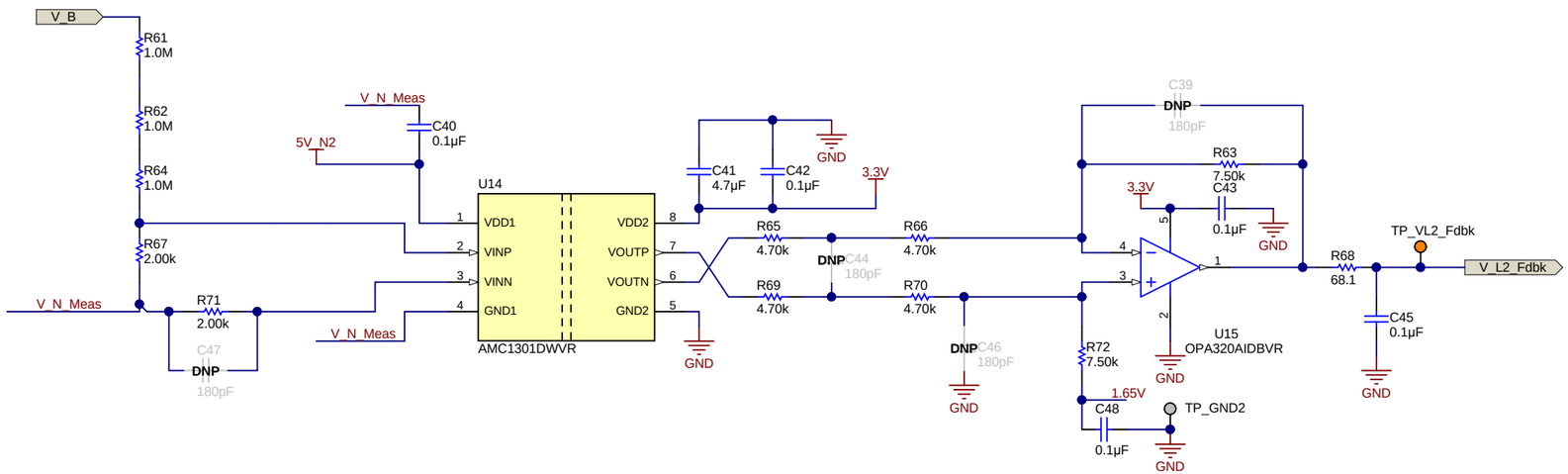
High Voltage



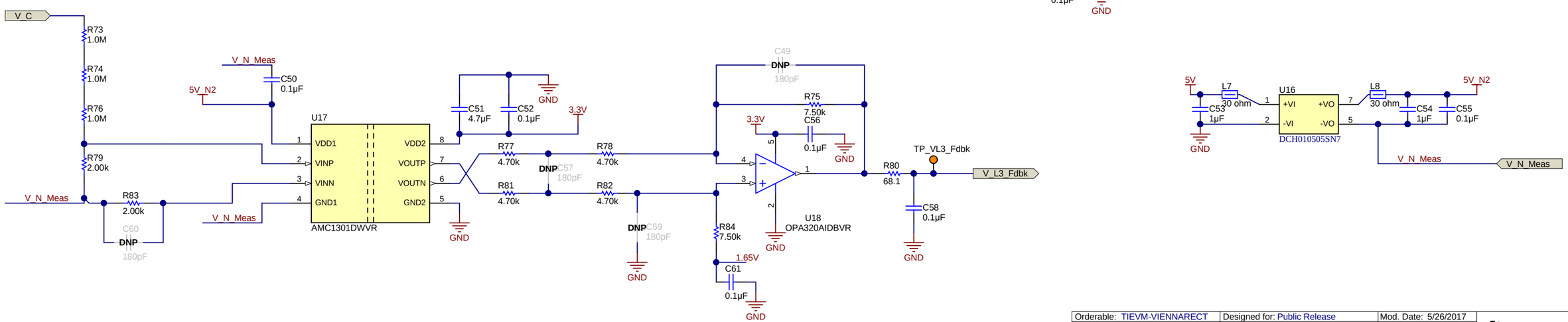
AC Input Voltage Sensing



High Voltage



High Voltage



Orderable: TIEVM-VIENNARECT		Designed for: Public Release	Mod. Date: 5/26/2017
TID #: TIDM-1000		Project Title: C2000 Three Phase PFC (Vienna Rectifier)	
Number: MCU011	Rev: A	Sheet Title: Input AC Voltage Sensing Interface Circuitry	
SVN Rev: Version control disabled		Assembly Variant: 001	Sheet: 5 of 10
Drawn By: Manish Bhardwaj		File: MCU011A_SensingInputVoltage.SchDoc	Size: B
Engineer: Manish Bhardwaj		Contact: http://www.ti.com/support	

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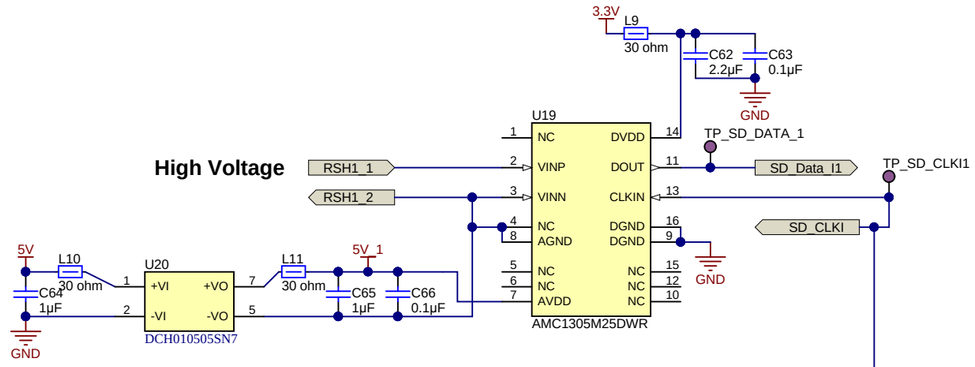
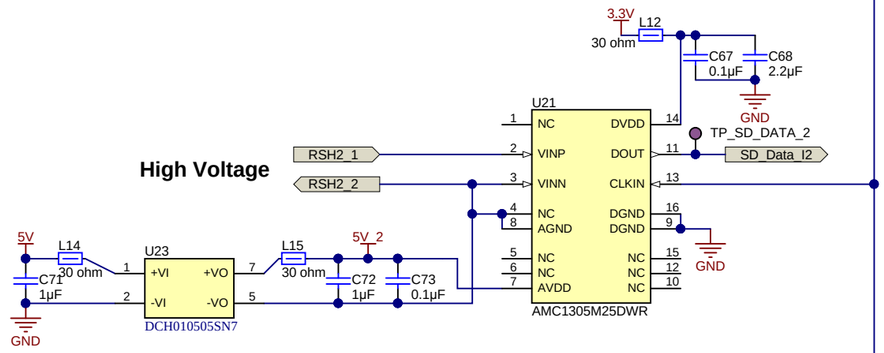
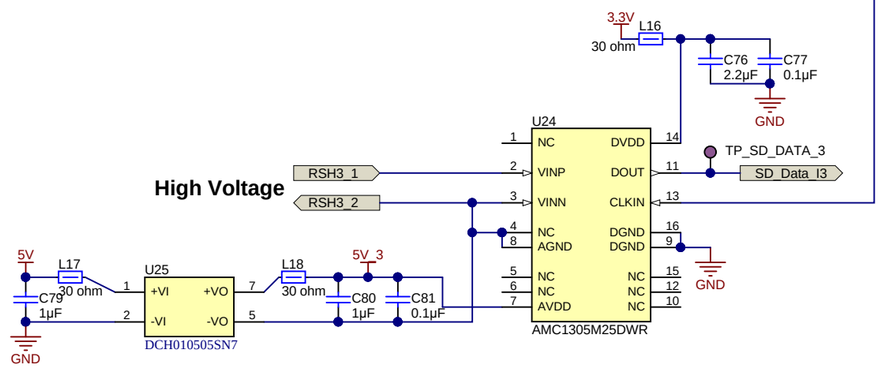
Keep these signals away from SD_Data_I1/2/3 ans SD_CLK signals , specially V_L1/2/3_Fdbk and V_BusM/P_Fdbk



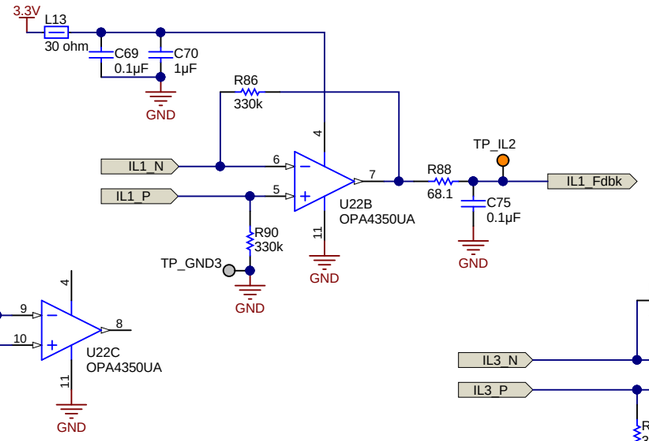
The connection from RSH1 should be close to U7, also a small GND island needs to be created w.r.t. RSH1_2 to help with the layout



The connection from RSH2 should be close to U8, also a small GND island needs to be created w.r.t. RSH2_2 to help with the layout



The connection from RSH3 should be close to U9, also a small GND island needs to be created w.r.t. RSH3_2 to help with the layout



Orderable: TIEVM-VIENNARECT		Designed for: Public Release	Mod. Date: 5/26/2017
TID #: TIDM-1000		Project Title: C2000 Three Phase PFC (Vienna Rectifier)	
Number: MCU011	Rev: A	Sheet Title: Inductor Current Sensing Interface Circuit	
SVN Rev: Version control disabled		Assembly Variant: 001	Sheet: 6 of 10
Drawn By: Manish Bhardwaj		File: MCU011A_SensingInductorCurrent.SchDoc	Size: B
Engineer: Manish Bhardwaj		Contact: http://www.ti.com/support	

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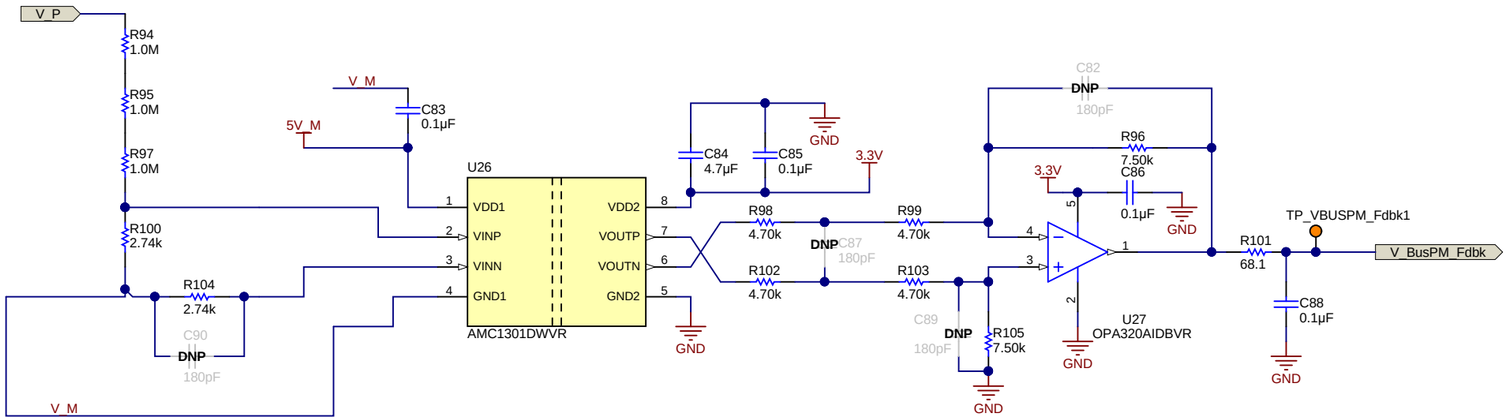
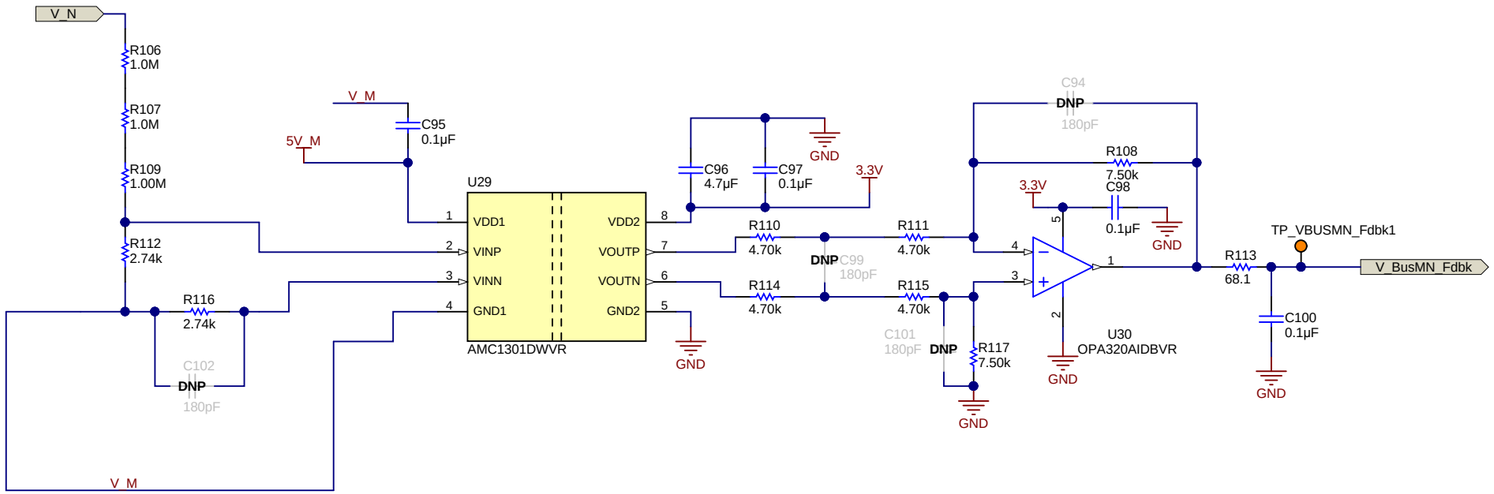
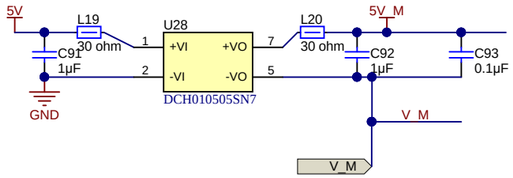
High Voltage



High Voltage





Orderable: TIEVM-VIENNARECT		Designed for: Public Release	Mod. Date: 12/20/2017
TID #: TIDM-1000		Project Title: C2000 Three Phase PFC (Vienna Rectifier)	
Number: MCU011	Rev: A	Sheet Title: Output DC Bus Voltage Sensing	
SVN Rev: Version control disabled		Assembly Variant: 001	Sheet: 7 of 10
Drawn By:		File: MCU011A_SensingOutputVoltage.SchDoc	Size: B
Engineer: Manish Bhardwaj		Contact: http://www.ti.com/support	

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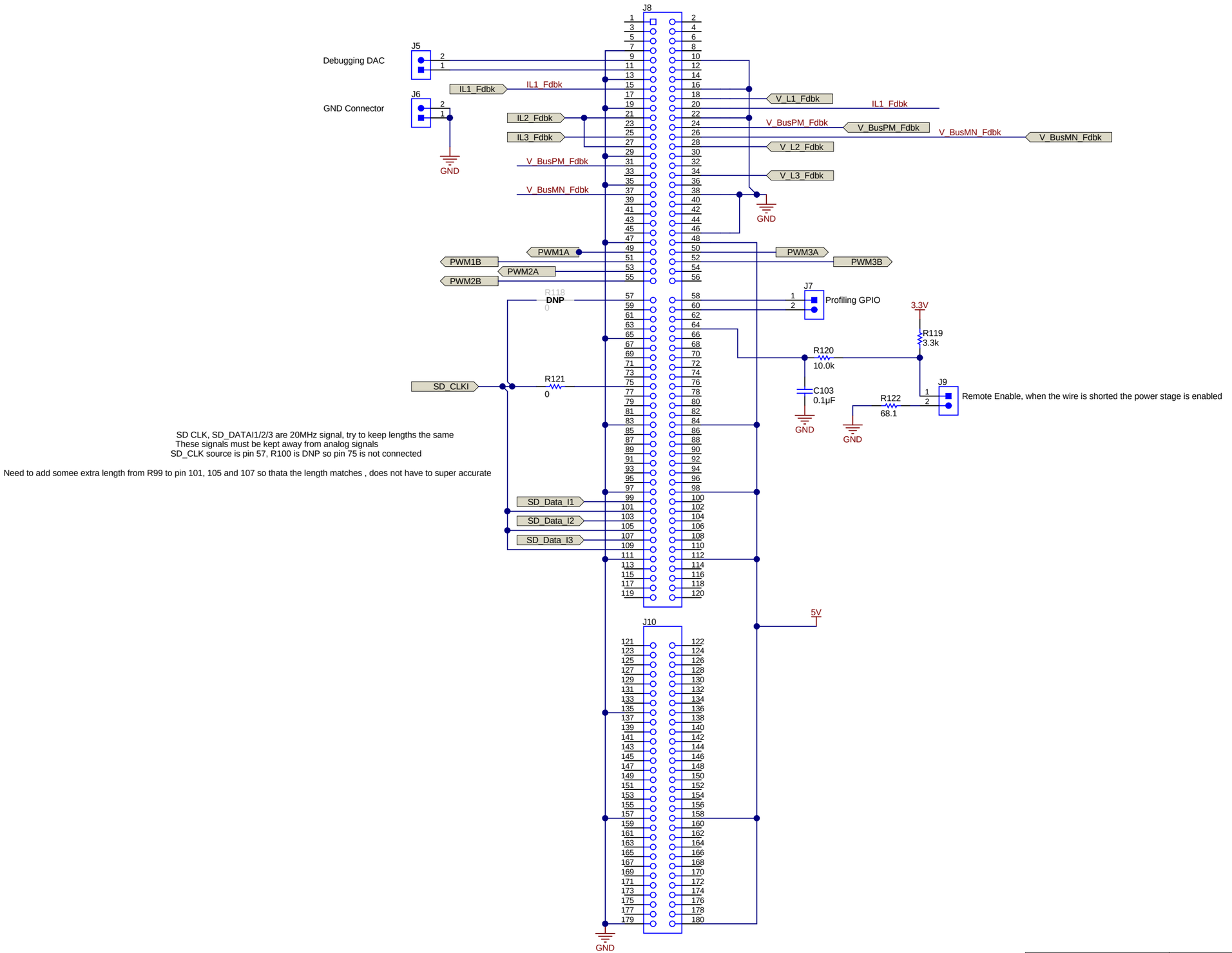

SD CLK, SD_DATAI1/2/3 are 20MHz signal, try to keep lengths the same
These signals must be kept away from analog signals
SD_CLK source is pin 57, R100 is DNP so pin 75 is not connected

Need to add somee extra length from R99 to pin 101, 105 and 107 so thata the length matches , does not have to super accurate

Please use HSEC180 PCB snippet.

Orderable: TIEVM-VIENNARECT		Designed for: Public Release	Mod. Date: 2/10/2017
TID #: TIDM-1000		Project Title: C2000 Three Phase PFC (Vienna Rectifier)	
Number: MCU011	Rev: A	Sheet Title: Control Card Interface	
SVN Rev: Version control disabled		Assembly Variant: 001	Sheet: 8 of 10
Drawn By: Manish Bhardwaj		File: MCU011A_Controller.SchDoc	Size: B
Engineer: Manish Bhardwaj		Contact: http://www.ti.com/support	

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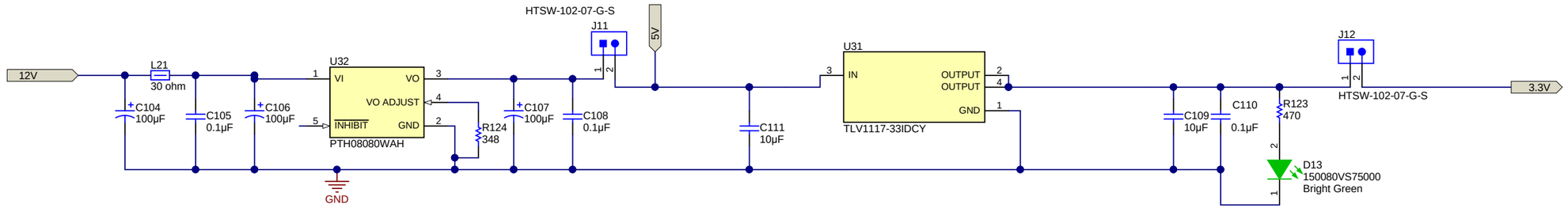

Orderable: TIEVM-VIENNARECT	Designed for: Public Release	Mod. Date: 12/8/2016
TID #: TIDM-1000	Project Title: C2000 Three Phase PFC (Vienna Rectifier)	
Number: MCU011 Rev: A	Sheet Title: Board Bias Power Supply	
SVN Rev: Version control disabled	Assembly Variant: 001	Sheet: 9 of 10
Drawn By: Manish Bhardwaj	File: MCU011A_ControllerPower.SchDoc	Size: B
Engineer: Manish Bhardwaj	Contact: http://www.ti.com/support	

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H1 NY PMS 440 0025 PH
H2 NY PMS 440 0025 PH
H3 NY PMS 440 0025 PH
H4 NY PMS 440 0025 PH
H5 NY PMS 440 0025 PH
H6 NY PMS 440 0025 PH
H7 NY PMS 440 0025 PH
H8 NY PMS 440 0025 PH
H9 NY PMS 440 0025 PH
H10 NY PMS 440 0025 PH
H11 NY PMS 440 0025 PH

H12 4800
H13 4800
H14 4800
H15 4800
H16 4800
H17 4800
H18 4800
H19 4800
H20 4800
H21 4800
H22 4800

Screws H41-46 and spacers H12-H15 , H47 are used to mount the board on the heatsink

H48 SJ-5003 (BLACK)
H49 SJ-5003 (BLACK)
H50 SJ-5003 (BLACK)
H51 SJ-5003 (BLACK)
H52 SJ-5003 (BLACK)
H53 SJ-5003 (BLACK)
H54 SJ-5003 (BLACK)
H55 SJ-5003 (BLACK)
H56 SJ-5003 (BLACK)
H57 SJ-5003 (BLACK)

DNP FID1
DNP FID2
DNP FID3
DNP FID4
DNP FID5
DNP FID6

PCB Number: MCU011
PCB Rev: A

PCB LOGO
Texas Instruments

PCB LOGO
Pb-Free Symbol

PCB LOGO
FCC disclaimer

H23
MECH
MCH013A

PCB LOGO
CAUTION! Read User Guide Before Operating

CAUTION! High Voltage Input

CAUTION! HOT SURFACE!

CAUTION! High Voltage Output

CAUTION! High Voltage

CAUTION High Voltage

SIL2 SIL-PAD-19X12.7MM
SIL1 SIL-PAD-19X12.7MM
SIL3 SIL-PAD-19X12.7MM
SIL4 SIL-PAD-19X12.7MM
SIL5 SIL-PAD-19X12.7MM
SIL6 SIL-PAD-19X12.7MM

SIL7 SIL-PAD-19X12.7MM
SIL8 SIL-PAD-19X12.7MM
SIL9 SIL-PAD-19X12.7MM
SIL10 SIL-PAD-19X12.7MM
SIL11 SIL-PAD-19X12.7MM
SIL12 SIL-PAD-19X12.7MM

SH-J1
SH-J2

CAUTION!! High Voltage

CAUTION!! HOT SURFACE!!

CAUTION! High Voltage!!

CAUTION! High Voltage!

CAUTION!!! High Voltage!!!

CAUTION!! High Voltage!!!

Insulator pads for the switches and dioded to mount on the heat sink

H36 MNI-HT-4-220
H37 MNI-HT-4-220
H38 MNI-HT-4-220
H39 MNI-HT-4-220
H40 MNI-HT-4-220
H41 MNI-HT-4-220
H42 MNI-HT-4-220
H43 MNI-HT-4-220
H44 MNI-HT-4-220
H45 MNI-HT-4-220
H46 MNI-HT-4-220
H47 MNI-HT-4-220

Isolator inlets so that the screws do not touch the switches and diodes

H24 NY PMS 440 0038 PH
H25 NY PMS 440 0038 PH
H26 NY PMS 440 0038 PH
H27 NY PMS 440 0038 PH
H28 NY PMS 440 0038 PH
H29 NY PMS 440 0038 PH
H30 NY PMS 440 0038 PH
H31 NY PMS 440 0038 PH
H32 NY PMS 440 0038 PH
H33 NY PMS 440 0038 PH
H34 NY PMS 440 0038 PH
H35 NY PMS 440 0038 PH

Socket Head Screws to mount the switches and diodes on the heat sink

F1 5SF 4-R
F2 5SF 4-R
F3 5SF 4-R

F4AL250V (F1-F3)

ZZ1
Assembly Note
These assemblies are ESD sensitive, ESD precautions shall be observed.

ZZ2
Assembly Note
These assemblies must be clean and free from flux and all contaminants. Use of no clean flux is not acceptable.

ZZ3
Assembly Note
These assemblies must comply with workmanship standards IPC-A-610 Class 2, unless otherwise specified.

ZZ4
Assembly Note
Mount heatsink H16 as specified in the mechanical drawing and assembly instructions provided separately

ZZ5
Assembly Note
Paste SIL1-16 on the heat sink or on the back of D1-D6, Q1-Q6, place the insulators H17-H28 on D1-D6 and Q1-Q6

ZZ6
Assembly Note
Place Fuses F1-F3 in fuse holder XF1-XF3

Orderable: TIEVM-VIENNARECT		Designed for: Public Release	Mod. Date: 1/4/2018
TID #: TIDM-1000		Project Title: C2000 Three Phase PFC (Vienna Rectifier)	
Number: MCU011	Rev: A	Sheet Title: EVM Hardware	
SVN Rev: Version control disabled		Assembly Variant: 001	Sheet: 10 of 10
Drawn By: Manish Bhardwaj		File: MCU011A_EVM_Hardware.SchDoc	Size: B
Engineer: Manish Bhardwaj		Contact: http://www.ti.com/support	

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